THE LEASING INDUSTRY, AND THE ROLE AND EVALUATION OF LEASING IN CORPORATE FINANCING STRATEGIES

BRIAN TERRY

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"He trudged along, unknowing what he sought,
And whistled as he went, for want of thought".

CYMON AND IPHIGENIA in FABLES ANCIENT AND MODERN 1699

PREFACE

It is estimated that the initial capital cost of equipment leased by U.K. organisations in the public and private sectors of the economy now aggregate to something like one and a half billion pounds sterling. However, opinions differ on several fundamental issues relevant to this phenomenon:

1. How and why has the pace and development been so rapid?
2. To what extent is and must leasing be a by-product of a particular system of corporate taxation?
3. How should an equipment leasing contract be evaluated?
4. How should the lease-or-buy alternatives be analysed?
5. What is the contribution of leasing to financial management strategies, especially in the management of working capital?
6. To what extent does the leasing decision, per se, involve an integration of corporate investment and financing decisions?
7. How should equipment leases be accounted for in the books of the Lessor and Lessee?

In a doctoral study of equipment leasing and company financing decisions, it is inevitable that the researcher must delve into a multitude of subject areas if he is to correctly portray the richness of the problem being confronted. Unhappily, the complexities surrounding the leasing decision are often overlooked in the literature in favour of a series of simplifying assumptions. Generally this approach is received with equanimity as being essential to the progress of knowledge and the understanding of complex issues. However, in order to achieve a satisfactory

examination of the leasing decision we require a broader frame of reference. Researchers must strive for a more complete understanding not only of the immediate problem, but they must also undertake a thorough analysis of what may appear to be (but on reflection are not) peripheral issues: such as, corporate taxation, mathematical programming models of the integrated investment and financing decisions, debt management and debt capacity, the commercial and economic environment in which leasing decisions are taken, and the formation of fixed and working capital.

Clearly, these topics are major research areas in their own right and this Thesis must of necessity restrict its enquiry into each subject, but because they inter-act with the leasing decision to such a significant extent they must be investigated and scrutinised in an effort to illustrate the true dimension of the problem.

Throughout the discipline of financial management there exists a most urgent priority for empirical research, and this is especially true of leasing. Prior to this study there has only been a limited exploration of industrial and banking practice in this regard, with most of the survey data being collected in the U.S.A. The issues and questions raised above are of significant concern to academic and businessmen alike, but empirical evidence in support of the various leasing algorithms proposed and a considered exchange of opinions are notably missing. Hopefully this Thesis bridges the gap in some measure and provides a route for other researchers to follow.

One problem that immediately confronts such an approach to research is that of perception. An important illustration of this difficulty is found in the debate between the modern-traditional and MM schools of financial theory, and the behaviour of executive in "real life". Like the philosophers stone, the concept of an optimal capital structure is illusive and yet is vigorously debated in theoretical argument; in practice its existence is believed in, but without sound rationale as to its precise location. The conceptual framework developed in this Thesis differs from prescriptive solutions as to the merits, or otherwise, of a pre-determined optimal debt-equity ratio, and favours the work of DONALDSON who argued that companies should develop a unique and internal assessment of their debt bearing capacity based upon their cash-flow projections and forecasts. Despite encouraging developments in industry towards this objective a good many executives do behave as if they were constrained in the development of their financial structure by a limit on their debt-equity ratio. Thus, when the leasing strategy termed "Spill-Over" is introduced -- where companies believe they have exhausted their normal supplies of debt capital -- it is quite clear that they behave as if existing pockets of debt can be exhausted and that their capital structure is at its upper limit, but that spare capacity exists in that pocket of debt termed leasing finance. This Thesis will explore some of the underlying reasons for this aspect of corporate behaviour which clearly depends upon a complex matrix of events and perceptions.

The hoped-for outcome of this research is to establish leasing as an integral part of corporate financing strategy. Most of the equipment leasing in the U.K. is written by one or other of the leasing subsidiaries of the banking or financial establishments in this country -- leasing is no longer (if it ever was) "second class financing", the "last refuge of an improvident manager."

SYNOPSIS

The U.K. capital market has observed a remarkable growth in the use of lease financing as a tool of financial management. It must be recognised, however, that its profitable use by Industry is dependent upon an easily applicable and theoretically acceptable method of evaluation within corporate capital budgeting procedures.

Increasingly, analysts have come to acknowledge the need to integrate corporate investment and financing decisions insofar as concerns the acquisition of industrial plant and equipment. However, traditional methods of lease evaluation fail to examine its integrative nature, and in consequence, they neglect the critical interdependencies which encompass the simultaneous decision process.

Extant lease evaluation models also fail to consider the consequences of the earnings generated by the "Residual Capital Balances". That is, the working capital freed when leasing is strategically used to relax what otherwise would be an unacceptable shortage of funds. Such earnings are a fundamental part of an integrated lease cash-flow profile under certain circumstances: namely, the use of leasing as part of a "Planned Financing Mix", as opposed to its use as an emergency or "spill-over" financing when no residual capital occurs.

On the basis of extensive empirical study into the circumstances under which U.K. financial management had recourse to leasing, a hypothesis was developed to explain the role of leasing in

corporate financial planning and debt management. The research proceeds to establish models for the evaluation of leasing under "spill-over" conditions (where all otherwise available sources of finance are, or appear to be, exhausted) and "Planned Financing" conditions (when the use of leasing in quantitative terms is formally envisaged as part of the corporate financing policy). In this way it is possible to determine the risks implicit in the haphazard use of leasing together with the benefits available to its planned use.

CHAPTER 1

THE INSTITUTIONALLY ACCEPTED/PERCEIVED ROLE OF THE LEASING INDUSTRY -- ITS HISTORY AND GROWTH IN THE UNITED KINGDOM

INTRODUCTION

In this Chapter a brief history of the development of lease financing in the United Kingdom will be traced, and some of the more relevant factors which have contributed towards its acceptance, growth and maturity as a financial instrument will be outlined. It is considered necessary to lay this foundation so that the reader is then aware of the current state of the leasing industry. It will also prove valuable to the discussion in later Chapters of an Industrial Survey, carried out as part of this research study, into the current attitudes of financial executives towards the use and evaluation of leasing finance.

As part of the opening debate the various advantages and disadvantages of leasing, as they are frequently seen in academic and professional literature on the subject, will be reviewed. Comment on the validity or otherwise of the points raised will be delayed until a later Chapter of the Thesis. As will be observed from the data presented, the growth of leasing in the U.K. (and indeed elsewhere in the world) has been quite remarkable. An effort is made to identify the more influential factors in this process by examining the rôle of Government and Fiscal intervention in the economy to control and regulate industrial investment (a subject which is returned to in Chapter 3). In particular, the impact on leasing of the various Capital Allowance systems that have been introduced over the years and the different rates of Corporation Tax are considered.

Throughout the discussion attention will be paid to the financial institutions which comprise the leasing industry, that is, the Joint Stock and Merchant Banks. Their motives for entering the industry are questioned: was it simply for taxation reasons, or was it a genuine desire to add to the portfolio of services they could offer to clients? This question is couched in the light of available data on the profitability of the leasing

industry, which for many lessors has been poor.

In the second Chapter a review of the current (1975) debate on the new Accounting Standard for the recording of the profitability of leasing contracts in the books of the lessor is undertaken. The major position, outlining a suitable technique to be adopted as an appropriate standard, is discussed in depth, with some of the implicit assumptions about the "nature and financing" of a leasing organisation that the proposal contains being challenged.

1.1. THE DISTINCTION BETWEEN, AND DEFINITION OF, AN OPERATING AND FINANCIAL LEASE

A lease is a method of financing the use of an asset. The leasing company - henceforth known as the lessor - will undertake to provide capital goods and equipment of almost any nature to a customer - henceforth known as the lessee - in return for a negotiated schedule of repayments.

The instalments will be paid over two distinct periods:

THE PRIMARY PERIOD Where the repayments to the lessor will be suficient to (i) amortize the initial cost of the equipment, net of any grant or allowance that may be available from the Government and passed on to the lessee, (ii) repay the interest costs incurred by the lessor and, (iii) cover the lessors overheads, administration costs and his profit in a predetermined series of instalments.

THE SECONDARY PERIOD

This occurs on termination of the primary period and can extend for a specified or indefinite number of years. The lessee is entitled to continue using the equipment on payment of a much reduced rental, (peppercorn rent), which usually takes the form of £1 per annum or a fee which represents a minimal percentage of the original cost of the asset.

There exist two principal types, or forms, of lease financing which were originally distinguished in the literature by R.F. VANCIL [135, p8-9]

OPERATING LEASES These may be defined as, a contract for the use of an asset which involves no significant future commitment for the lessee. An operating lease may be cancelled by the lessee with only a short period of notification being required. The asset would then be returned to the lessor. The use of an operating lease gives the lessee an increased flexibility in that it enables him to continually review and adjust the level of assets he funds in this manner.

The lessor will expect short period contracts for operating leases with a variety of lessees sequentially using the same asset over its lifetime. Thus, the rate at which the rental is set is a reflection of the

amount of compensation required by the lessor in return for the potential risk of being unable to re-lease, or sell, the asset. As a general rule, the type of assets attracting operating lease facilities are subject, by their very nature, to an uncertain and often rapid obsolescence. Hence, while operating lease rentals may be considered high, part of that cost is an insurance policy paid to reduce the consequences of a more catastrophic loss that could possibly ensue if the asset was owned by the lessee. Two further technical points: it is extremely unlikely that the asset will be wholly amortized during a specific operating lease contract; and, as may be deduced, there is no secondary period in an operating lease although payments may be designed to reduce after a given amount of time has expired.

FINANCIAL LEASES These may be defined as an contract involving payment over a specified period of a sum sufficient to amortize the initial outlay and associated costs of a lessor plus his profit. This obligatory, or primary, period is generally less than, or at most equal to, the estimated useful life of the asset. Once this period is completed the lessee is entitled to negotiate for a secondary period of usage of the asset, generally at a nominal period rental. The lease involves a significant and unavoidable future commitment of cash-flow as it cannot be cancelled. Nor usually can it be made the subject of a major revision in the terms (In practice, cancellations or revisions are not unknown, although they

are infrequent: however, given honourable intention on the part of the lessee, they are not usually envisaged when the lease is first agreed)[1]. The lessee is invariably responsible for maintenance and all other incidental costs associated with the asset, such as repairs and insurance, unless such services form part of the contract. A financial lease is sometimes refered to as a fully pay-out lease.

For purposes of determining the extent of a company's Corporation Tax liability, the Inland Revenue must be satisfied that the lessor retains <u>at all times</u> the legal ownership (equity) of the asset, while the lessee will have physical possesion and use of the asset during the contracted period. This very strict legal aspect of leasing distinquishes it from the other common varients of instalment debt currently available. It is relevant to differentiate between the three most frequently observed categories, namely: leasing; hire purchase; and conditional sale.

> "Selection of the asset by the lessee normally distinguishes leasing from hiring. In hiring (including plant hire and contract hire) the assets are usually bought by the hiring-out firm before the initial user appears on the scene. The hiring-out firm is in business to hire-out a particular range of goods in which it specialises and for which it charges a regular tariff. The intending user chooses from the stock already

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1. The termination of a lease contract may be allowed providing that (a) the lessee recompenses the lessor with a lump sum equal to the remaining value of the instalments plus an agreed penalty, or (b) if the lessee intends to update (increase) the value of his commitment by trading-in the original asset for a more expensive one.

held by the hiring-out firm.

In contrast, the first step in leasing is for the user to select a particular asset on which a lease is then negotiated. Such a negotiated lease is often on tailor-made terms and is with a third party (the leasing company) who acquires the asset after it has been chosen by the lessee. Leasing

> companies are financial institutions which are in business to lease any item of capital equipment which their customers may wish to buy".

[42] EQUIPMENT LEASING ASSOCIATION

The Equipment Leasing Association is the London based collection of U.K. lessors and representative body of the leasing industry (hereafter termed the E.L.A.).

A conditional sales contract, on the other hand, is more well known and widely used in the United States. Occasionally, some poorly phrased and hence bogus leasing contracts may allow the lessee to purchase the equipment at the termination of the primary period. The Inland Revenue would class such a lease as a conditional sale and withdraw the taxation privileges enjoyed by a lease.

> "Under the (conditional) sales contract, the buyer agrees to buy a particular piece of equipment and pay for it in instalments over a one-to-five year period. Until payment is completed, the seller of the equipment continues to hold title to the equipment. This fact gives rise to the name <u>conditional</u> sales contract - the sale is conditional upon a satisfactory completion of the payments. While the contract is being paid

> off, the purchaser has possesion of the equipment and uses it in his business".
>
> WESTON & BRIGHAM [144, pp 529/30]

One further important term in the leasing 'vocabulary' may also be noted -- "leveraged leasing". When an asset is the subject of a leveraged lease the following, frequently complex, arrangements have been made:

A holding company will be formed between three parties, (1) the lessee, (2) a genuine leasing company or bank, and (3) a group of individuals or companies. The function of the leasing company is to act as negotiator, administrator and general intermediary between the groups. It is normal practice for the lessor to contribute a modest amount of 'equity' to the deal, but the majority of the capital is provided by the individuals or companies by way of a 'debt' contract between them and the holding company. Thus, the total capital sum is said to be levered, being part 'equity' and 'part debt'[1].

In the vast majority of cases it is only worthwhile organising such a detailed agreement for very large contracts running into millions of pounds[2]. The financial backers of the lease are invariably seeking to profit from the tax shelter afforded by the lease, as such it is common for them to be highly liquid and subject to a high rate of taxation. It is more common to observe leveraged leases in the U.S.A., where they have been practiced for several years. However, there are some notable examples of this form of financing contract in the U.K. (vide,

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1. The terms debt and equity are somewhat of a misnomer, or legal fiction, in that both groups provide debt. For all practical purpose the distinction is artificial (except that it could be said that the leasing company is involving some of its or its parents equity) serving only to differentiate between the two sources of funds provided.
2. For further details and case-studies see VANDERWICKEN [139] and CHILDS& GRINDLEY [33]

the British Rail scheme discussed in more detail in section 1.7 infra). The purpose of this Thesis is to explore the profitable use of lease financing within corporate capital budgeting procedures. As such it will be necessary to judge leasing by some economic indicator in order to determine the extent of its use, and the conditions under which it is most advantageous to employ it as a financial strategy. The quantitative analysis of a leasing contract will be considered in later Chapters, but at this juncture an examination will be made of what have come to be regarded as the 'institutionally accepted advantages and disadvantages of leasing'. Comment on some of the issues raised will be postponed until the matter is considered in depth at a later stage; or, given that the issues relate to industrial practice, until the Industrial Survey of U.K. financial management's perceptions of leasing is considered.

Nonetheless, where it is appropriate some comment and discussion will take place. Hopefully this will assist a realistic detachment of myth from reality and provide an opportunity to determine whether the 'pros and cons' frequently mentioned in the literature and promotional advertising are indeed accurate.

Many of the points mentioned in the list below have indefinable origins, growing in number as leasing became more widespread and people began writing on the subject. It is not intended to be in any way an exhaustive list; however, it is hoped that the major advantages and disadvantages are covered. A variety of source material[1] has been used, but

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1. For example: VANCIL [135]; E.L.A. [42] ; McLEAN [96] ; B.I.M. [23] ; BARNES [11] ; GANT [58] ; OGDEN [108]; JACKSON [78] . Other sources include the Financial Times and the Investors Chronicle.

it would be tedious to reference every item as this would in some sense imply originality where clearly none exists.

1.2 THE ADVANTAGE OF LEASING - FOR THE LESSEE

1. Leasing only involves a limited initial charge on capital to secure a productive, cash generating, asset. As such, it does not 'tie-up' capital in depreciating equipment and has the added advantage that future lease instalment can be made from the income produced by the equipment itself. Because the commitment can be self-liquidating it is commonly thought to be popular among companies which are expanding fast with limited capital resources. This technique is sometimes referred to in the literature as 'boot-strap' financing.

2. Leasing can ease and help control cash-flow planning in a company. If the cash-flow profile can be anticipated with some degree of accuracy then it may be possible to circumvent present or forecasted illiquidity by skillfully using leasing to overcome capital restrictions and obtain what perhaps may be a much needed piece of equipment. The leasing companies will be prepared to negotiate schedules of a specific shape and size in order to accommodate expected cash-flow peaks and troughs. This manipulation of repayments may help to increase the planned investment in machinery which under normal circumstances would have to be foregone through lack of liquid resources. Leasing is a highly flexible financial source able to offer advantages which conventional forms of finance rarely can.

3. Repayments are known and fixed at the outset and are not expected to fluctuate from the original contract. This assists forward planning, budgeting and management discipline. Cash-flow forecasts are strenthened and future problem areas may be anticipated and prepared for.

4. Leasing commitments do not appear directly in the lessee's Balance Sheet. At the present time the only statutory obligation regarding disclosure in the accounts of the lessee (in regard to hire charges payable) is contained in paragraph 12(1) (gb) Schedule 2, Companies Act 1967.

FURTHER CONSIDERATION OF ADVANTAGE 4

The above Act requires that the amount if material charged to revenue in respect of sums payable for the hire of plant and machinery should be disclosed as a separate item in the statutory Profit and Loss account of a company. This is in many ways a very unsatisfactory piece of company law as it does not differentiate between the various forms of hiring, nor does it give any clear indication of the capital commitment undertaken by an organisation when it leases. The use of the subjective term 'material' is often open to wide interpretation[1].

At the time of writing the Equipment Leasing Association has submitted a detailed proposal[2] to the Accounting Standard Steering Committee of

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1. It is interesting to speculate whether the hiring of a telephone system, for example, comes within the spirit of the law.

2. Entitled, "Report and Recommendations on Accounting Procedures for lessors and lessees of industrial and commercial equipment". Submitted to the ASSC 28th July, 1974. This is discussed extensively in Chapter 2.

the Joint Accountancy Bodies which is intended to influence the direction of a future exposure draft on this subject. An analysis and criticism of part of their proposal is to be found in Chapter 2.

There is a wealth of literature, mainly American, on this aspect of leasing which is generally known under the all embracing title of "Off Balance Sheet Financing". The range of views expressed is wide, but they seem to warrant classification under three alternative propositions relating to the recording of the corporate use of a lease:

A. It is argued that lease payments are in every respect similar to debt repayments and, consequently, the lease repayment schedule should be capitalised at some appropriate rate so as to reflect this debt equivalence. The resulting liability would appear in the Balance Sheet together with the written down value of the asset[1].

   Needlesstosay, a great deal of debate centres around the selection of an appropriate rate of discount and the consequent impropriety of recording in the accounts an asset which is not owned, nor will never be.

   In an important study commissioned by the American Accounting Institute in 1962, MYERS [104] suggests four alternative capitalisation rates:

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1. There is a body of opinion which looks at this problem from the view of divisionalised companies and financial ratio analysis. Thus SOLOMONS [125,pp131,134] and KNUTSON [83] suggest that lease repayments have similar characteristics to a conventional depreciation charge. Suitable capitalisation of leases would then ensure comparability with 'ordinary' fixed assets when computing divisional or corporate return on capital performance ratios. TOMKINS quite rightly notes this potential loophole in divisional reporting and warns that, "The possibility of leasing equipment instead of purchasing it merely to increase the reported divisional return on investment should be forseen by head-office". [131,p144].

(i) The lessor's earning rate: "the interest rate to be used in discounting the rental is that used in setting the rentals".

(ii) Adjust the current "prime rate of interest" for the lessee's creditworthyness.

(iii) Add a half of one percent to the cost of the last debt raised by the lessee.

(iv) Add a half of one percent to a debt instrument of similar size as the lease that the lessee could currently raise[1].

VATTER [139,p127] dismissed them all and suggested the lessee's cost of capital; while ZISES [149,p40] considers that a decision to capitalise a lease may in the end prove to be detrimental to the industry. For if, as it is assumed, the purpose of capitalising a lease is to express its debt equivalent, then ZISES feels that the past "customs and mores" of the U.S. Revenue would cause them to reassess the full tax deductability of lease rentals and replace this with a tax relief system based upon the implicit interest costs of a lease, as per their debt counterparts. It is possible that this line of reasoning still prevails in the leasing industry (although no evidence is given), and perhaps this acts as a strong disincentive against capitalisation in favour of more disclosure - as the E.L.A. suggest - which presumably will not disturb the unique tax position of leasing.

The proposed accounting treatments of leasing in the Balance Sheet of the lessee has prompted two counter arguments against capitalisation.

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1. The last two figures typify the extreme arbitrariness of much thinking on leasing at that time. For example it is redolent of GANT's [59] belief that funds provided by financial leases typically cost a half a percent more than interest costs on direct debt. The way in which the lessor determines the rental to be charged on a lease is reviewed below in section 1.9.

B. The Accounting Principles Board of the American Institute of C.P. A's has prepared two opinion drafts, No. 5 and No. 7, published in 1964 and 1966 respectively. They were entitled [3] & [4] "Reporting of leases in financial statements of lessee's". In summary form they suggested that for financial leases[1]:

> The Accounts should disclose sufficient information, so that the reader of the accounts will be able to assess the present and future financial position and operating results of the lessee. Hence, a note must be attached to the accounts disclosing the minimum annual rental and the period over which it was to be paid[2].

ZISES [149,p47], who may be considered as representative of the American 'full disclosure' school of accounting, would argue that such a proposal is more workable than the capitalisation alternatives:

> "Capitalising long term rentals and commitments and placing them on the balance sheet today would incorrectly equate these commitments with debt; would not provide full and objective disclosure; but would produce a devastating situation because of:

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1. Should the contract be framed so as to suggest the lease is actually a purchase then the opinion recommends that the lease be capitalised as an asset and the discounted value of the payments shown as a liability.

2. For a full discussion of the ramifications and practical problems faced by a company that has an extensive portfolio of leased assets covering many different starting dates, finishing dates and costs, see K.S. AXELSON [8]. He shows how a genuine attempt at proper disclosure can result in an extremely confusing picture for the shareholder.

1. Fundamental problems of determining objectively and fairly the figure to be placed on the Balance Sheet and in adjusting the figures for operational, tax and other considerations.
2. Possible catastrophic effects upon management, stock-holders and creditors under outstanding indentures, current and changing tax laws, and regulations of industry.
3. The legal liability of accountants in public practice if such techniques were adjudicated as "misrepresentation".

While it is reasonably easy to agree with the first point, the latter two lack credibility, in that accountants would observe the rules and guidelines prescribed by the appropriate professional body, at least in the U.K. (although this may not be valid in a U.S. context). Legal liability of the company, on the other hand, prompts WYATT [146,p37] to write:

> "Noncapitalisation of leases in financial statements creates risks of straying from fairness in financial representation ... The key question is whether there is in existence at the reporting date an underlying contractual type of relationship that creates a claim on the resources of the enterprise ... Omission from the Balance Sheet of the substansive claim incurred when a noncancellable lease agreement is signed creates an understatement of liabilities and must be the result of an overemphasis on legal technicalities".

C. The above comment by WYATT, emphasising the legal liability entered into when undertaking a lease, would appear to be sound. However, this fact alone does not turn the argument in favour of capitalisation, as a direct and unbiased method of disclosure by note would still represent a fair financial presentation.

Surprisingly, a notable body of opinion in the United States would disavow the validity of recording a capitalised lease figure in the accounts. It is considered, however, that such legal reasoning applies only to operating leases, but the quote below is intended to apply to financial leases:

> "Leasing companies, officials, and lawyers, describe a lease as an executory contract, an agreement that services will be performed in the future. Since the performance of the services and the resulting execution of the contract are based upon contingencies, it is maintained that the obligation under a lease, unlike that of a conventional debt, is not fixed and the legal liability is indeterminate and unpredictable. A related distinction is that in the event of bankruptcy a direct debt is recognised as a claim against the debtors assets, while the trustee in in bankruptcy may disaffirm a lease obligation. For these reasons, a lease obligation is frequently considered uncertain or too conjectural to appear as fixed debt on a balance sheet".
>
> HAMEL [70]

The recent events at Court Line Ltd., where several aeroplanes were leased, would indicate that in the U.K. a lessor will regain his asset, but will not receive preferential treatment among the

various creditors when claiming any penalty clauses[1].

The recommendation issued by the E.L.A. [43] on "accounting by the lessee" rejected the capitalisation of the lease payments and suggested a more detailed method of disclosure. The audited accounts would then show:

1. The total amount of future lease repayments after the date of the current Balance Sheet.
2. The time period covered by the repayments, and
3. The total amount of repayments to be paid in the twelve months following the Balance Sheet data.

Undoubtedly this method of disclosure is superior to the present legislation, but is it totally satisfactory? The problem faced by a financial analyst trying to estimate the capital value of leased equipment being used by a company with several leasing contracts, spanning several years, is still as difficult. The information given only provides a partial, albeit improved, answer. Indeed, the problem is very similar to the accounting treatment of depreciation: a full schedule of each asset's depreciation to date is not issued: for reasons of obvious impractically, the figures are published in

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1. Several U.K. lessors have been questioned on their interpretation of the legal status of a lease. In general they suggest that, "we remain legally vulnerable, because no suitable test case has been heard on some of the more unconventional clauses of a lease contract, like variable interest and repayment schedules in particular. What is the allowable variation? Given that leasing contracts as presently written are tending to move away from their traditional position as a 'conventional method of hire', and hence are not fully covered by Hire Purchase Legislation; the extent of the lessors liability is a question that is under continuous review". For an excellent discussion of the legal standing of a lease in the event of bankruptcy see ZISES [149]. Although this is an early American text, 1961, it may well contain all, or nearly all, the relevant legal points that would be used in a British court.

aggregate. In doing so, much vital information may be lost to the reader of the accounts as he may only estimate the age of the company's plant and equipment, with no means of testing the accuracy of such an estimation. A similar problem arises with leasing, in that the reader of the accounts must use judgement and appraisement to obtain a realistic figure for a company's capital commitment to leasing.

In view of the general acceptance of the "off balance sheet" argument in the literature[1], and the general acknowledgement that this characteristic is capable of enhancing two of the favourite financial ratios- debt to equity, and return on capital employed - it would not be too uncharitable to suggest that footnote disclosure is to the advantage of the Equipment Leasing Industry. However, the E.L.A.'s proposal is a positive step in eliminating the distorted corporate image that can occur if lease obligations are overlooked when calculating indebtedness and efficiency of capital. It does seem unlikely, though, that Institutional investors[2] and major creditors would overlook the possible use of leasing in the capital structure when contemplating an investment in the organisation -- they are just not deluded by the "off balance sheet" argument and will ask questions accordingly, being in a strong position to do so.

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1. A pioneer survey by VANCIL AND ANTHONY [132], USA 1959, indicated a strong opinion in favour of the "off balance sheet" argument. This article is frequently cited as an indication of management perceptions on the use of leasing --- despite the date of the paper.
2. Leach in a survey [85] during 1971 estimated that 35% of the equity of U.K. registered and managed companies are owned by institutions. Today the unit trusts, insurance companies and pension funds are estimated to own in excess of 80% of the equity of U.K. companies: See Financial Report, The Guardian, October 6th, 1975.

ADVANTAGES OF LEASING CONTINUED

5. Leasing is not a loan .... leasing is not an additional form of borrowing it is a revenue item[1].

The above statements would certainly apply to short-term cancellable operating leases as quite clearly they offer a service and not a loan.

However, it appears that in the minds of many writers and financial executives the presence of a tangible asset, instead of cash, is prima facie proof that a lease is not a loan !

A financial lease is equal in status to any of the more conventional forms of debt as there exists a contractual obligation to repay the entire amount of the outstanding repayments. The commitment is ineluctable.

6. Leasing provides 100% financing: thus making the entire cost of the asset available immediately. This may not be the case with other debt instruments[2].

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1. For example, see OGDEN [108,p747], a typical early U.K. writer on leasing. It is also staggering to see and hear this attitude still persisting: SPRINGHAM [126,p304] and LEWIS (Financial Times, March 21st 1975,p14, in a special feature on leasing) both write, "leasing is not borrowing".

2. The Government Bill entitled "The Control of Hiring and Hire Purchase and Credit Sale Orders" introduced various distinctions between leasing and the hire-purchase of vehicles. For example one third of the cost must be paid immediately when using H.P., with a maximum repayment period of two years; whereas with leasing a 42 weeks prepayment must be made. For other assets a 25% downpayment is required when using industrial hire-purchase.

One of the prime advantages of leasing is that the lessee is only required to make the first instalment at the commencement of the contract. This enables a rapid build-up of equipment in a particular desired area of the business so that a competitive edge may be gained in the light of some new opportunity. Or, it facilitates virtually-instant replacement of defunct machinery without the delay necessary to accumulate the total cash-price.

7. Operating leases permit the hedging of business risk, particularly obsolescence, as the contract will normally have a rapid cancellation clause. Lessees can therefore have the most up-to-date model of any machinery ..... which may give benefits of productivity, product marketability or simply prestige. Computers and some highly sophisticated types of advanced equipment which have a reasonable second-hand market are the prime examples. VANCIL [135,p9] puts the issue succinctly:

"As the name implies, a financial lease is primarily a device for permitting the acquisition of a piece of equipment without paying cash for it. The chief purpose of an operating lease is to permit the lessee to use a piece of equipment without running the risks of ownership. Obsolescence, one of the major ownership risks, is borne by the lessee under a financial lease; and it is shifted to the lessor under an operating lease".

Financial leases may <u>not</u> protect the lessee from obsolescence depending upon how the contract is written: if the agreement is immutable

then even if the asset is rendered catastrophically obsolete, and hence valueless, the lessee would still be committed to repay the fixed instalment schedule; however, and this is increasingly becoming the case, it is possible to organise specific leasing agreements which contain a clause setting out the various possibilities under which the lessee may surrender the asset (on payment of a penalty fee) providing that a new, and probably more expensive, asset is substituted in its place and a new lease contract drawn up.

In general, therefore, it follows that the type of asset leased in the financial and operating lease categories bears some relation to: its present and future marketability; the risk of obsolescence; the industrial category of the lessee; the opportunity for economies of scale, with such assets as cars and trucks; the asset's place of location; the extent to which the asset is for specialised or general use; etc. etc..

8. Lease rentals are considered to be operating expenses by the Inland Revenue, thus making them chargeable in full against Corporation Tax. The Capital Allowances generated through the purchase of an asset goes to whoever possesses the equity in the asset, which in all cases of financial lease contracts is the lessor.

   The particular legislation is in the Capital Allowances Act, 1968, Sections 42 and 43 and there is some case law[1] associated with

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1. Namely: Macsaga Investment Co. Ltd., v. Lupton (1967) AU.E.R. 930, 44 T.C. 688 and; Lupton v Cadogen Gardens Development Ltd., (1971) 1. All E.R. 717.

these matters concerning the nature of subsequent costs or contracted maintenance.

9. The current system of Capital Allowances enables a company to defer, to future periods, its current tax liability. As the lessor is granted the Allowance he can quantify this advantage and pass it on to the lessee in the form of reduced rental costs. This system is particularly beneficial to those equipment intensive companies whose taxable profits are currently nil or negligible; and by extension whose future taxable profits are anticipated to be approximating to zero. Hence, such companies will obtain no benefit from these Allowances if the asset was bought outright, but would obtain an advantage, via a smaller repayment schedule, if they leased the asset. However, it follows that the lease tax shield would be smaller -- indeed it may possibly not exist in a zero taxable profit situation.

As a financing strategy the use of leasing in these circumstances can be particularly advantageous to companies with previously accumulated Allowances; companies with high cost assets that would swamp a poor profitability; and many of the nationalised industries who have several years of accrued deficit.

10. Leasing is a hedge against inflation. The terms of a lease contract, if fixed, offer a definite advantage in a period of high inflation as the real money cost of the repayments will effectively fall over the period of the lease. Equally, the interest rate may

be fixed at the commencement of the contract which again offers distinct advantages in a period of rapidly rising interest rates. It should be noted that fixed repayment schedules have in practice become increasingly rare in today's market[1], being replaced by variable interest, taxation and VAT clauses[2].

11. Leasing simplifies accounting procedures and administrative effort through the convenience of only having to make one periodic payment. In conversations with U.K. lessors who deal with small to medium sized companies it is clear that this is a strong incentive to lease.

12. Leasing provides what may be a "financing-gap" in some companies by providing medium to long-term finance with the added advantage that it does not dilute ownership or control. As with all debt the profitable use of leasing can provide leverage to the equity earnings.

13. The asset to be leased will generate earnings which will help pay the lease instalments: this is sometimes termed a "bootstrap" operation, where effectively the asset pays for itself.

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1. To the best of my knowledge only one company maintains a strict, no variation, lease contract. It might also be added that they are one of the major U.K. lessors.

2. As mentioned in advantage 4, variable rate clauses have not received much attention in law so it remains unclear to what extent a lessor can pass-on various charges.

1.3. THE DISADVANTAGES OF LEASING - FOR THE LESSEE

1. The implicit interest rate charged on either type of lease may well be higher than existing channels of debt open to the lessee. Fairly obviously, leasing costs[1] are subject to considerable fluctuation in just the same manner as ordinary debt. For example: LESTER [86] in 1972 put the cost of leasing at 12% to 13%; HAMEL [71] in January 1972 suggested a price of between £21 and £25 per month for every £1,000 of equipment leased on a five year term. This implies an effective interest charge of between 11% and 16% per annum.
By contrast, estimated costs at the beginning of 1975 indicate a band running between 22% and 25%. The latter price may be compared with the Hire Purchase charge at the time of either 4% above Finance House base, or 18% to 20% effective rate[2].

2. The nature and extent of tax advantages and disadvantages to the lessee and lessor are of considerable importance; this will be discussed at length later as part of an overall corporate

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1. As will be discussed in a later Chapter, the sources of funds to a typical U.K. lessor (termed in the jargon his "moneybook") are heavily biased towards short-term finance. Hence, they are exposed to the classic banking problem of borrowing short and lending fairly long.
2. An interesting development (1975) in the leasing of fleets of company cars and trucks has arisen following the sharp downturn in the registration figures for new vehicles. The emergence of a 'price war' between the major manufacturers (Datsun, Chrysler, Vauxhall and Austin Morris) has meant a variety of different leasing schemes with average flat rates of 9% (... a real rate of 16%). It is recognised by all the companies that such a low cost means they will loose money on the financing aspect of each deal, but they are so concerned with funding their own increased stockpile that they are prepared to take a much reduced profit in order to improve cash-flow and liquidity.

tax strategy, see Chapter 5.

3. At the termination of the primary period of a financial lease, the equipment in question may still retain some residual value (as either scrap or second hand sales value). This sum may become a tail-end bonus to the lessor, at the expense of the lessee, depending upon the wording or termination provisions of the contract. Many writers consider this to be a distinct disadvantage to the lessee as it is a cash-flow he would have gained had he bought the asset himself; thus they argue that the lessee has suffered an opportunity loss if he cannot recover some portion of this value. However, the issue is spurious as any advantage to either party is neutralised if the lessee has a right to exercise the clause enabling him to use the asset in the secondary period. Many of the contracts signed today make the lessee responsible for disposing of the asset at the end of the primary period. He may then sell to the highest bidder using his specialised knowledge of the second-hand market for such assets, and in general receive a proportion of the sales price.

   An operating lease cannot be considered in these terms as it is strictly a short-term expedient utilised so as to avoid outright purchase.

4. "Leasing can result in a loss of control over capital expenditure. Unless leasing is controlled at the operating level the

result may be that divisional managers will be able to obtain assets through leasing which they were denied appropriations for in the budget. Some companies have recognised this possible danger by instituting a seperate leasing budget".

GANT [59]

5. "Leasing may result in distortions in the evaluation of inter-company performance. To the extent that leased assets are used, the comparison of a return on invested capital between divisions can be distorted. Some companies have overcome this by capitalising lease rentals in measuring return on capital investment".

GANT [59]

SOLOMONS [125,p132] gives the same advice as GANT and suggests that in order to preserve the comparability of divisions the "capital value of leased equipment should be brought into the investment base of the leasing division".

(Further discussion about the capitalisation of leases is delayed until Chapter 2).

6. A financial lease establishes an immutable committment on the company's future cash-flow which, if not properly controlled, will enchance the possibility of cash inadequacy or even insolvency.

7. A leased asset is not an owned asset. The extent to which pride, prestige, emotion and psychology inhibit a rational

economic decision to use leasing is extremely relevant in any discussion of the use of debt. These factors will be dealt with further in Chapter 7.

1.4. THE ADVANTAGES OF LEASING TO THE SUPPLIERS OF PLANT AND EQUIPMENT

There are also advantages to be gained by the manufacturer or supplier of equipment whose goods may become the subject of lease agreements. This may well take the form, sometimes refered to as "captive leasing", where a manufacturer will incorporate an associated leasing company to distribute its products.

1. The superior technical knowledge of the manufacturer can be utilised by the lessee. This can be particularly beneficial in the areas of maintenance and servicing. The contract is mutually advantageous to both parties: the lessee will receive specialised help and advice; the lessor is able to gain contacts and discuss new product development with potential customers.
   The computer companies, and office equipment and furnishing companies, are extremely active in this area.

2. Market penetration may be increased by the offer of attractive "use now-pay later" lease facilities. The use of a third party lessor enables the manufacturer to offer a credit function while assuming no risk himself.

A BRIEF RESUME

While the above listing of advantages and disadvantages is not exhaustive, it is considered to be a reasonable representation of some of the alleged qualitative factors which management will commonly use, or come into contact with, when making the leasing decision for a company. A list of advantages and disadvantages for the lessor has not been made as, in many cases, they merely replicate or mirror, the list for the lessee.

In a later Chapter the results of an extensive Industrial Survey into the use and appraisal of leasing are discussed; this will clarify how current-day financial management views leasing and what qualitative factor they consider important to the leasing decision.

1.5. I THE LENGTH OF FINANCIAL LEASING CONTRACTS

The Equipment Leasing Association [42,p7] has issued some sample statistics taken from its members on the length and character of leasing terms. As previously mentioned most financial leases provide for a primary period and a secondary period. The actual length of the primary period depends upon negotiations between the lessee and lessor about, for example: the anticipated useful life of the asset, the prevailing conditions under which the lessor is able to raise the finance, and the expected cash-flow profile generated by the asset in use. Given a reasonable estimate of these figures a suitable repayment schedule can be devised.

Generally, this will range from one to ten years, but can be longer in the case of specific assets. The E.L.A. data yields the following:

PRIMARY PERIOD	% DISTRIBUTION
up to 3 years	14
over 3 to 5 years	72
over 5 to 7 years	7
over 7 to 10 years	3
over 10 years	4

No data is available for the length of the secondary period: this is because many of the leasing contracts written by the lessors have not yet matured into the secondary period. Preliminary evidence[1] suggests this period to be short, perhaps no more than two years.

1.5. II TYPICAL PROVISIONS AND CLAUSES IN A U.K. LEASING CONTRACT

The following list is synthesized from a number of specimen lease contracts obtained from a selection of the larger U.K. lessors together with a series of discussions with leasing managers. Quite obviously the points mentioned are intended only as a brief guide[2] -- further detailed information is available from the E.L.A. or any lessor. Thus, a typical lease agreement would contain some or all of the following provisions:

1. The lessor shall at all times retain the legal equity of the asset.

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1. Obtained in conversation with various U.K. lessors.
2. Such agreements are frequently of great legal complexity: one lessor whom I contacted said that the typical length of his company's contracts exceedded 100 pages -- a commercial necessity in view of the equipment he was leasing.

2. The lessor shall receive, in the first instance, all Government grants, allowances or incentives that are applicable to the asset or its location.
3. The lessee shall not offer for sale, dispose of, or transfer the asset, to a third party.
4. The lessee is responsible for the cost of maintenance, insurance, legal costs, incidental expenses and (occasionally) the cost of returning the asset to the lessor, or an agreed location, on completion of the contract.
5. The lessee is held fully responsible for any loss or damage to the asset.
6. The lessee must obtain prior permission before undertaking alterations or modifications to the asset. The lessor retains the right to refuse such alterations.
7. The asset must be firmly situated in one place and marked with an identification plate (if possible).
8. The lessor may inspect the asset at any time.
9. The lessor shall receive all benefits of the manufacturers guarantee; all correspondence or litigation on such matters is to be conducted between the lessee and the manufacturer.
10. The lessor may terminate the agreement in the event of a default in payment by the lessee; the insolvency of the lessee; or the failure to comply with any clause of the contract. In all cases the lessor may recover the asset, claim all subsequent legal or miscellaneous expenses, plus any penalty payment and all outstanding repayments (to be charged with interest at x% above Bank Rate for the period outstanding).

11. The lessor and lessee will negotiate and agree to the length of the primary period, the size and frequency of repayment; plus details of how to exercise the secondary period and its associated rental. In addition provisions may be agreed to pass to the lessee (in part or in toto) any increase in the lessor's costs caused by changes to the tax-rate, interest-rate or government grant. Limits on the range of such change may be set in advance (ie. + or -3% in tax or interest rates).
12. The asset is to be disposed of by the lessee (or lessor) and the subsequent sales proceeds divided in a certain proportion between the lessee and the lessor.

1.6. THE GROWTH OF LEASING

Leasing can justifiably claim to be one of the original instruments of commerce to be developed by mankind. Its recorded historical pedigree stretches back over 5000 years to the ancient civilisations of Egypt, Greece and the Roman Empire where it is reputed to have been used to finance real estate, shipping, slavery and the trade of certain commodities between the major ports of the Mediterranean[1].

As an instrument of Financial Management and Treasureship however, leasing was to emerge in the United States during the 1940's as a radical and most timely alternative to the conventional forms of long-term debt then in use. Original writers on the subject[2] attribute its modern day development to three factors:

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1. See VAN CLAES and LIVIJN [136]
2. For example see McNEILL, 1944 [97] and perhaps more persuasively COHEN 1954 [37]

1. A substantial change in the financial climate which was influenced heavily by the depression and later the war.
   This resulted in a substantial impetus to re-equip and expand investment thoughout the nation.
2. The gradual emergence of a body of economic and financial literature (led by authors like FISHER, HICKS and DEWING) which resulted in more professional and better educated managers and accountants.
3. And finally, what was without doubt the most crucial factor, the ever escalating cost of new equipment that was being produced in response to the technological developments of the day.

The great surge of economic development stimulated the banks and finance houses to devise new methods of funding the demand for industrial capital; one of which was the avoidance of outright payment and the substitution of instalments covering several years and repayable either monthly or quarterly. The banks, with their long and successful association with the leasing of land and buildings, had little difficulty diversifying this aspect of their business to incorporate industrial machinery.

As was noted above, a theme running directly parallel to that of the general requirement to modernise old plant was the ever increasing cost of replacing machinery. The cause of such a rapid rise in costs was the notable sophistication and complexity of a wide range of new industrial technology. It was a generally held opinion of contempo-

rary writers that the aircraft industry provided the necessary fillip[1].

"The advent of the commercial jet airliner has confronted the airlines with a great many problems, but none more imposing than the question of how they are to raise the tremendous amounts of additional capital required to finance the change over from piston-type aircraft"

GANT [59]

"In recent years airlines have begun to lease rather than buy their aeroplanes under equipment trust arrangements. This change was necessitated by the hugh financing requirements of the second generation of aircraft. Under the equipment trust arrangements banks, finance companies or individuals typically supply 25% of the cost of the aeroplane. The trustees in the arrangement, who lease the equipment to the airlines, borrow the remaining 75% on a straight debt basis".

SHAPIRO & WOLF [122]

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1. See GANT [59] or VANCIL [135] who concur on this point. More recent studies by SHAPIRO & WOLF [122] and GRITTA [67] also come to the same conclusion. For a review of the tremendous inpact made by leasing on the balance sheets of today's U.S.A. aircraft corporations see GRITTA. His study shows their extensive reliance on leasing and calculates the effect of capitalising leases on some of their financial ratios, noting the quite remarkable deterioration of return on capital and debt to equity ratios.

Today the United States leasing industry is flourishing[1], chiefly as a result of significant changes in the banking regulations made during 1973 which allowed the very large state and national banks to become lessors. Various tax changes have also given an added impetus to the industry in recent years and VANDERWICKEN [137] notes that leveraged leasing is now becoming more widespread as a result of these alterations.

The following quote gives some impression of the impact of leasing in the USA capital equipment sector of the economy:

> "Capital Equipment with an original cost of somewhat more that $ 60 billion is now on lease in the US to Corporations, Institutions, and Governments. New equipment worth over $ 11 billion was leased last year (1973), and it accounted for about 14% of all business investment in capital equipment. Overall the volume of leasing is expanding by around 20% a year. If leasing continues to grow at its recent rate, by 1977 about one-fifth of all new capital equipment in use by business will be leased".
>
> VANDERWICKEN [137,p136]

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1. There are various estimates of the growth of leasing in the USA; the following assessments have been made:

U.S.A. Growth of leasing $ million (10^6)					
1950 *	1960 *	1965 *	1971 *	1973 **	1974 **
10	400	1000	23,000	75,000	87,000

* obtained from the publication DER MIETFINANZE
** estimates by PARRA and MATHEWS [110,p136] but see alternative figures given in quote above.
For a full discussion of the development of the USA leasing industry during 1960-1966, including the impact of the various investment credit systems and tax changes, see BRIGHAM [21]

Within Europe the development of leasing came some 15 years later (the first U.K. leasing company being established in 1959/60) and the following statistics serve as a comparison between the various countries.

FRANCE --- first leasing company in 1963; see CADE [28]

billions of Francs

1968	1969	1970	1971	1972	1973
2.3	5.05	8.15	11.63	16.33	21.14

NEDERLANDS --- first leasing company in 1963; see GOUDSMIT & KEIJSER [62]

millions of Gilder

1969	1970	1971
34.5	66.6	125

The statistics for GERMANY, approximately 3000 million Marks in 1971, and BELGIUM approximately 400 million Francs in 1970 are not well developed; see GOUDSMIT & KEIJSER [62,p13/15] or FEIST [50,p21/33]

The development of leasing in the U.K. has been ascribed to a similar set of circumstances as prevailed in the U.S.A.:

"Under the pressure of competition firms began to find an increasing need to replace their existing assets by more modern equipment, but found also that the cost of replacement - particularly in the case of custom built machinery - was a growing obstacle due to the increasing sophistication, and

consequently the increasing cost, of plant and machinery. The attraction of spreading payments for a new machine out of earnings began to assume greater importance, particularly with the increase in the rate of inflation".

E.L.A. [42,p9]

Currently there are three sources of statistics compiled with the intention of shedding some light, however dim, on the growth of lease finance within the U.K. Firstly, the Department of Trade and Industry issue[1] quarterly figures under the heading:

"FINANCE HOUSE: Goods owned which are the subject of hiring, leasing or rental agreements"

£ MILLION

1965	1966	1967	1968	1969	1970	1971	1972	1973
50	55	64	95	127	164	216	256	325

Prior to 1966 funds employed in leasing equipment were negligible in comparison to other capital sources for industry, but between that date and 1973 there was a fourfold increase in the size of leasing business undertaken by Finance Houses. At the end of 1968 leasing represented only 9% of the effective investment of these institutions. During the next three years 33% of their new investment

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1. Source: Business Monitor, official statistics Ref. Nos. SD6 and SD7. They are also to be found in the magazine CREDIT, the Finance House Association's Quarterly Review.

went into leasing assets and in 1973 over 25% of their business was in the leasing sector.

However, the compilation of official statistics which attempt to indicate the levels of leasing in this country are acknowledged to be notoriously inaccurate[1]. There are at least two reasons for this:

1. The statistics are essentially incomplete as they do not take account of: business undertaken by independent leasing companies who are not members of the Finance House Association; transactions undertaken by the 'secondary banking sector' and the 'captive leasing' sector; and individually arranged intercompany leasing contracts[2].They are also unlikely to record leasing arrangements with customers who will use the goods overseas.

2. As is clear from the statistics above, leasing is never recorded independently but is amalgamated into an overall figure for instalment debt and industrial hire purchase.

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1. To quote from a letter to the writer from the director of the Equipment Leasing Association:
   "On the matter of statistics, our efforts have been mainly directed to persuading the authorities to improve the official collection of leasing statistics rather than collecting statistics of our own. We carried out a very limited exercise as a one-off rather than a continuous study in order to demonstrate to the authorities that their existing statistics are inadequate".
2. "Like most of the leasing subsidiaries of banks we were originally set up to shelter the profits of our Parent Company, and although this is still part of our business, we now specialise in packaging large scale leases for clients without necessarily taking them onto our own portfolio". Hence, they will not be recorded in the official statistics. Private correspondence with the Managing Director of a large U.K. Leasing Company.

Not surprisingly, there are many independent estimates of the true extent of leasing in this country; BUCKLE [26] suggests that:

> "The worldwide growth of leasing since the early 1960's has been phenominal. In the United Kingdom, from the date of the first leasing company in 1959, the industry has grown to the stage where there are now thirty five to forty active leasing companies in the market. In money terms the market has grown from nil to an annual investment of £350 million in fourteen years".

An independent survey of the leasing industry by GREENE & CO. [63] of the stock exchange, considers the previous two sets of data to be conservative estimates. They suggest that the industry now provides equipment with an initial cost of £600 million. This agrees with an estimate by the E.L.A. (see footnote on previous page) of approximately £580 million which was acquired by its members in the following pattern[1].

£ MILLION OF LEASED ASSETS

1967	1968	1969	1970	1971
19	35	56	112	121

The current compound growth rate of the U.K. leasing industry is estimated at a substantial 20% per annum[2].

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1. An analysis of the 1971 figures, by area, shows:

   (a) Goods leased in development areas 7.7%
   (b) Goods leased in non-development areas 92.3%

2. See GREENE & CO's report [63].

Clearly, such development will have a significant effect upon the U.K. capital markets and may indicate (as shall be discussed later) a change of influence in corporate financing strategies .... towards an increasing reliance on short-term instalment debt. In order to develop a deeper understanding of the leasing industry, it is worthwhile attempting to trace the impact and repercussions of Government and Fiscal intervention upon the economy and see how this relates to leasing. Hopefully, this will provide a further, perhaps valuable, insight into the circumstances of its growth and its possible prospects for the future.

1.7. GOVERNMENT AND FISCAL INTERVENTION: ITS EFFECT UPON THE LEASING INDUSTRY

Successive Governments, in an effort to direct and invigorate the economy, have made frequent adjustments to a variety of economic parameters which, inter alia, have directly affected the lessor's ability to obtain a reward for his services. This intervention has taken either of two forms:

1. The alteration of capital incentives given to industry in an attempt to raise investment .... for example, investment grants and the designation of development and special need geographical areas or industries.

2. The alteration of various forms of tax incentives afforded to

industry .... for example, Capital Allowances, tax abatements, tax write offs and carry forwards.

To indicate how these various factors have altered over the years, consider first the rate of Corporation Tax:

CORPORATION TAX RATE %

APRIL '66	APRIL '68	APRIL '70	APRIL '71	APRIL '73	APRIL '74
MARCH '68	MARCH '70	MARCH '71	MARCH '73	MARCH '74	
42.5	45	42.5	40	50	52

The fluctuation of tax rates, which are to all intents and purposes unpredictable to both lessee and lessor at the outset of a leasing contract, undoubtedly creates a great deal of uncertainty in the industry. It can also have a quite pronounced effect on the profitability of a leasing deal. A lessor has three possible reactions to this:

(i) be prepared to absorb the loss or gain himself (willingly or unwillingly);

(ii) ensure that the lease payments will vary pro-rata with the tax rates over the period;

(iii) transfer the potential risk of monetary loss directly to the lessee through higher charges.

The latter two modes of action are not a very attractive option to the lessor as it will reduce his competitive edge in what is a highly competitive market.

Perhaps a more significant problem to the lessor is the legislation covering investment incentives - in particular Capital Allowances - which have been subject to a similar, if not more dramatic, series of variations.

The last ten years have seen a wide variety of changes which undoubtedly have altered the relative position of the industry within the money market. Chronologically the respective allowances have been:

8th April 1959 — A 30% investment allowances system was reintroduced in addition to the initial allowances.

17th January 1966 — The Labour Government decided to abandon the investment allowance method of incentive and substitute direct cash grants. This scheme was, however, resticted to certain defined types of new plant (in the manufacturing and extractive industries, ships and computers).

Initial allowances were retained for all other new equipment and secondhand equipment. The Government varied the rate of cash grant twice during its remaining life.

27th October 1970 — The Conservative Government abandoned the investment grant approach and substituted the

system of overall accelerated tax depreciation as an investment incentive. The rate of first year allowance was initially set at 60% of original cost.

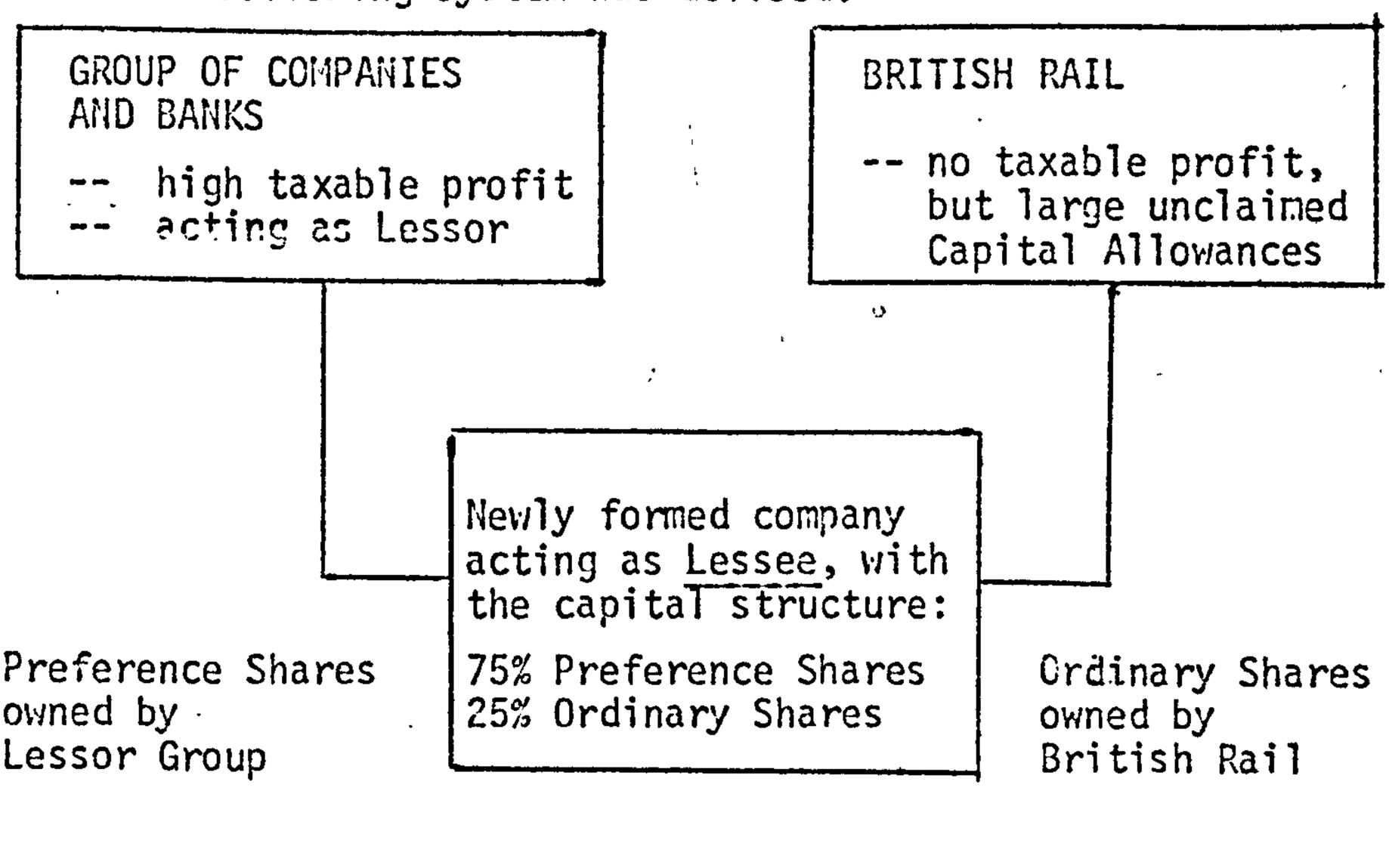
20th July 1971	First year allowance raised to 80%.
22nd March 1972	First year allowance raised to 100%.
Industry Act 1972	This allowed leasing companies to receive government grants for capital equipment which was to be used in certain designated areas. The amount of the grant was set at 20% of the qualifying expenditure, or 22% in very special development areas, rising to 30% in Northern Ireland.

The constant manipulation of allowances, while being welcomed because it has followed an upward trend, has nevertheless caused consternation in the industry because of the ever increasing demands it has placed on the predictive qualities of the leasing manager. The effect of increased tax rates plus varying allowances has created an instability in the lessor's profits and an inability to determine, or in any sense control, customer requirements for lease finance.

A further development in Government legislation, designed to eliminate a widely publicised and notorious loophole in the law, was in-

troduced in the 1973 Finance Act. Prior to this date public corporations, and British Rail in particular, had undertaken only a marginal amount of leasing. However, during 1972 and 1973 a rather ingenious scheme[1] was devised to utilise the vast, previously accrued, tax losses of British Rail. With their vast programme of capital expenditure it could be predicted that they would have a zero tax liability for several years to come, and little possibility of using the Capital Allowances such expenditure would generate. It was decided to undertake several million pounds worth of leasing business - rolling stock for themselves and a series of assets for other companies, ships and computers for example.

Due to a divergence at the time between company law and corporation tax law the following system was devised.



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1. Somewhat similar to the U.S.A. 'Leveraged Leasing'

Prior to the Act, the new subsidiary company was

(i) a subsidiary of the lessor for corporation tax purposes and

(ii) a subsidiary of British Rail for accounting purposes.

Because the new company leased goods with no obvious relevance to the rail industry, thereby denying to the Revenue tax from other corporate bodies, the Government decided to stop the practice. Today, public corporations continue to participate in lease financing by the conventional method but (according to a letter sent to the writer by the finance director of the Coal Board) they must inform the Treasury and obtain permission before commencing the negotiations[1].

A third major problem area for the leasing industry is the influence and role played by interest rates and money supply.

1.8. THE INVOLVEMENT OF THE BANKING SECTOR IN LEASING AND THE IMPACT OF CHANGING INTEREST RATE STRUCTURES

The Merchant and Joint Stock banks were both relatively late entrants into the leasing industry for two reasons:

(i) In the tradition of conservatism which surrounds the

---

1. The nationalised industries and local government participate extensively in leasing but the extent of this activity is unknown. This topic is a research area in its own right and is not discussed further in this thesis. For an overview of the problems involved see BATES & FRASER [12]

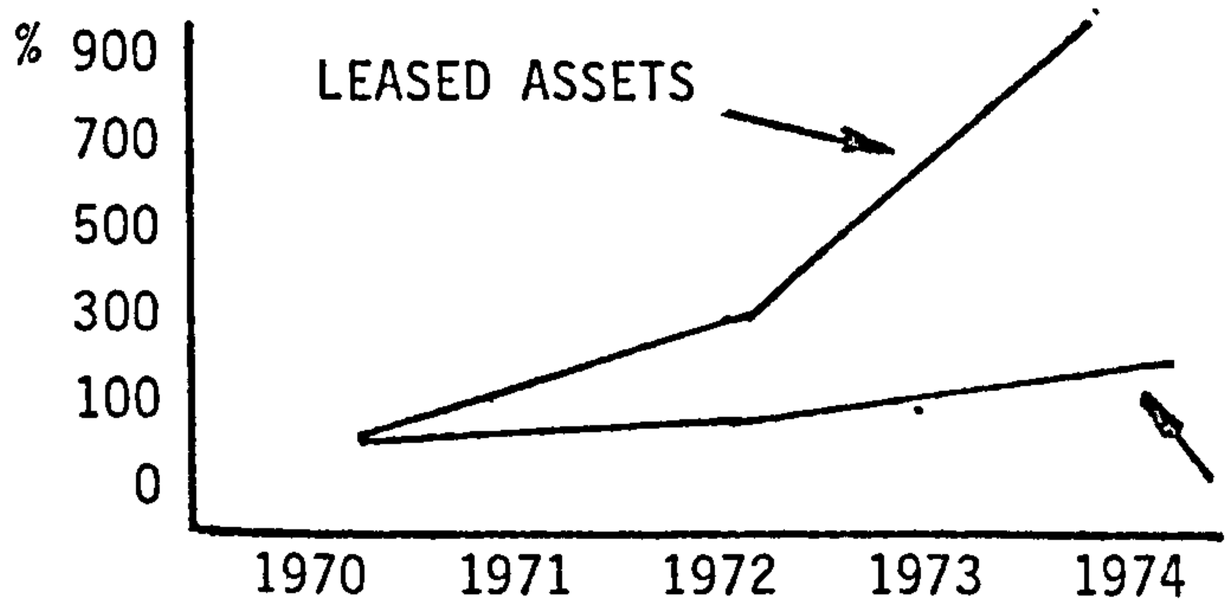
City and its institutions, leasing was looked upon as a rather incongruous form of banking (this would equally apply to industrial hire purchase).

(ii) Prior to August 1971, the Bank of England had exhibited a very strong influence in the banking sector by restricting the type of financial activity to that permitted by custom and the traditional canons of "sound banking" and law.

However, due to a change of Government economic policy, leasing emerged as an attractive financing medium through which the Banks could acceptably enlarge the range of their activities. Two dates are significant. 1967 produced the following catalyst:

> "The stampede into leasing by the banks really got underway in 1967-68, when the Labour Government imposed a ceiling on bank loans to customers. This ceiling, which continued until 1971, did not cover leasing and banks that would be willing to lend money to customers so that they may buy new plant were happy to lease the plant to the companies instead".
>
> GEDDES [60,p229]

The move into leasing was indeed significant but the real 'take-off' point for the industry was 1972; when 100% first year Capital Allowances were introduced.



GROWTH OF BANKS ASSETS
PERCENTAGE INCREASE (1970=100)

Source: Investors Chronicle
April 1975

It is sometimes denied that the 1972 surge in leasing business was purely for taxation reasons[1]; and perhaps this is partially true.

However it is argued here that the advantages bestowed on the lessor's parent bank through the medium of group relief of taxation would make leasing a highly attractive financial proposition to the banking group. As such, if the various reasons were to be ranked to explain their entry into leasing, it is argued that several million pounds of potential tax shield would be more of an inducement than any altruistic gesture to their customers[2].

Four principal strategies were employed by the banking sector in their highly successful entry into leasing.

1. Perhaps the most common method was the development of a leasing subsidiary which was owned and financed by the parent bank. For example:

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1. "Although the influence of the 100% first year capital allowances on the recent growth of leasing has been substantial, the entry of the banks into leasing should not be regarded as being tax-motivated. The clearing banks saw leasing as a growth industry in which, as major financial institutions, they should be involved". T. CLARK, Chief Manager, Lloyds Leasing from INVESTORS CHRONICLE April 11th, 1975 p.vii supplement on leasing. See also page 36, supra, footnote 2.

2. Although it must be recognised that during the early 1960's the Banking Sector in the U.K. (and indeed elsewhere, particularly America) was undergoing far reaching changes; noticably seeking methods of diversification from the traditional, but no longer germane, colonial past: viz, the contemporaneous emergence of leasing and factoring in response to changing trading conditions and practices -- see WESTLAKE [142,Ch6] for an excellent review of the history of the factoring industry during this period. For most of the 1960's, however, both these forms of finance represented only a very small proportion of the banking turnover -- they were very much 'fringe-finance' -- but they epitomized the change to more sophisticated and imaginative banking, to higher-risk lending. Their development was also partially influenced by the then pressing need to utilise to maximum potential the newly acquired computer hardware and personnel that so dominated the early stages of the technological era of banking.

National Westminster	-	Lombard North Central
Midland	-	Midland Montague
Lloyds	-	Lloyds Leasing

2. Alternatively, banks began to purchase assets and equipment at the request of their customers and lease them direct. In the main this was the province of the Merchant Banks, for example: William Brandts; Schroders; Hambros; Hill Samuel; Klienwort Benson; Rothchilds and Slater Walker.

3. Thirdly, and the medium through which leasing achieved the "big ticket" status, was the formation of several leasing consortiums comprising of groups of banks capable of financing extremely large projects. For example, Airlease and Orion (discussed again shortly).

4. And finally, a few banks began 'take-over bids' for existing leasing companies. For example Barclays Bank and Mercantile Credit[1].

There are, of course, various independent lessors, the most prominent of which are: I.C.F.C., United Dominion Trust, Lloyds & Scottish, Bow-makers, and First National.

To emphasise the growth of the leasing industry GREENE & CO. (op. cit) prepared an extensive data collection exercise of 20 leasing companies.

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1. Mercantile Credit, as one of the leading lessors in the U.K., collapsed in 1975 under severe financial pressure.

Two of their illustrations showed the following trends, over the period 1968-1972.

TABLE 1.1.

A SAMPLE OF LEADING LESSORS	GROWTH IN ASSETS [1] %	GROWTH IN PROFITS [2] %
FIRST NATIONAL	177	120
FORWARD LEASING	153	91
BOWMAKER	128	103
HAMILTON	35	52
COMPUTER LEASING	31	35

(continued overleaf)

1. The median growth rate was 30% for the total sample; with the Finance House leasing sector averaging 20%.

2. "The median rate of profit growth is 86.25%. Compound interest and Tax Equalisation Accounts do have a miraculous effect on profits". GREENE & CO [63,p44]

A SAMPLE OF LEADING LESSORS	GROWTH IN ASSETS, %	GROWTH IN PROFITS, %
HILL SAMUEL	29	123
LLOYDS & SCOTTISH	27	45
WILLIAMS BRANDTS	26	87
MERCANTILE CREDIT	17	85
U.D.T.	16	227

The ensuing success and current dominance of the lessor banks is not surprising in view of their unquestionable understanding of, and position in, the money market. Their posture as established and trusted organisations has to a certain extent managed to raise the industry's image from the 'hire purchase' (and 'factoring') sectors, with their poor psychological status, into the realm of serious corporate finance. Furthermore, their increased access to larger sums of prime rate capital would conceivably reduce the cost of leasing below that obtainable by its predecessors, thereby making it a more attractive economic proposition. In effect, their massive financial backing and willingness to deploy substantial resources in the business and its promotion, expanded the limits of the industry.

Funds were now available for extremely expensive equipment whether it be Oil Tankers, British Rail rolling stock, or Concorde.

Examples of their financial strength and international capability[1] are easily found .... Orion Leasing Holdings is a consortium of six shareholders: Chase Manhatten; Credito Italiano; Mitsubiski Bank; National Westminster; Royal Bank of Canada; Westdeutsche Landesbank... with assets over £35,000 million. In the U.K. single projects such as the British Rail scheme demanded the financial co-operation of Bankers and individual companies. Morgan Grenfell brought together Barclays, William and Glyns, Great Universal Stores, G.E.C., Distillers and themselves to act as joint lessors on the project.

Leasing now forms an integral part of the spectrum of financial services offered by a bank, indeed (as will be discussed later in the survey of U.K. lessors, Chapter 7) leasing compliments other sources of finance. On the basis of the argument thus far it is possible to advance the following tentative speculation as to why and when leasing is used:

1. It could be because leasing is in demand, for some as yet unspecified reason, when other short to medium term financial services are not, or

2. The banks expect their customers to traverse the range of debt instruments in a specified sequential order. The movement would per-

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1. As PALMER [109] of the Finance Times hypothesizes:
"The whole concept of a multi-national leasing deal which, for example, could involve a U.K. based company using Swiss raised funds to lease U.S. equipment to a German company operating in Italy. This is based on the premise that, first, transborder companies prefer to deal centrally with one finance house and, second, that the cost of a multinational deal will be more expensive if arranged in individual companies".

haps start at the highest quality debt, such as a long term debenture, and gradually move through less senior and more expensive forms of debt to leasing.

Continuing this brief incursion into work to be considered in later Chapters, it is worth pausing to reflect on the reversal of the impressive growth rate in leasing during the latter half of 1972. This provides an opportunity to make an initial probe into the circumstances surrounding leasing as a financing strategy.

The downturn in equipment leasing differed quite noticeably from the general increase in capital expenditure during this period. This was attributed to:

> ".... the combined factors of low interest rates and high money supply".
>
> SHELDON [124,p645]

On first reading this would appear to be a curious comment as, by inference, one could postulate that the popularity of leasing would therefore be at its peak - or more actively indulged in - when interest rates are highest and money is in short supply. This gives rise to a series of questions:

1. Does the leasing subsidiary of a bank deliberately dampen down its monetary supply (through not allowing leasing) to its customers under such conditions?

2. Does the lessee simply fail to use leasing when terms are cheap? Or,

3. Is the lessee forced, through lack of available options in a 'tight' money period, to lease when terms will by implication be expensive?

The first hypothesis is considered below. However, we must delay a full discussion on items 2 and 3 until the results of the Industrial Survey are analysed.

The fluctuating demand for equipment within a company may not be the prime motive for seeking lease arrangements as one might at first suspect. Instead, as the SHELDON quote would imply, the restriction of credit alternatives, precipitated either by a given economic climate or the financial standing of a company, would appear to be of greater influence.

The lessor, of course, has a sound economic rationale for such action:

"Leasing companies would not compete for business because they would not lock themselves into a five year agreement at last summer's (1972) low rates of interest".

SHELDON [124,p645]

Here it can be further postulated that as the lines of corporate credit become depleted, or even exhausted, -- for example the overdraft ceiling is reached -- then the Banks intervene in an indirect manner by supplying finance for capital investment through their leasing subsidiary. By implication leasing could be conceived of as one of the more risky forms of business entered into by a Bank. Furthermore, the lessor may effectively discourage good credit-rating customers from using leasing because the price structure is based upon more risky clients. It would follow from this argument that financially weak companies may gain this extra credit facility purely because <u>in the last resort</u> the lessor's collateral is the equipment itself[1]. A further interesting, and indeed penetrating, insight into the modus operandi of the banking and leasing environment is that a company may be refused an increase in its overdraft ceiling yet, simultaneously, be allowed to undertake a lease with the leasing subsidiary of the company's bank.

While leasing <u>may</u> be viewed as a logical extension of a bank's services,

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1. In the event of the lessee becoming insolvent and being forced into liquidation, the lessor will have substantial, and generally <u>total</u>, protection and equity of his asset --- as this will not legally rank against the insolvent estate of the lessee: there is no question of another creditor placing a lien on the leased asset. The lessor will, of course, be put to the inconvenience of recovering and re-selling (or re-leasing) the asset. He may also be able to recover the costs involved in such an operation plus any contractual, 'termination of the lease' fee, which may have been negotiated. However, these latter two items have no special priority or seniority over other claims by creditors. A priori, therefore, the lessor is uniquely placed in terms of security; and as such, it may be argued that leasing could be a highly suitable financial instrument of "last resort".... see Chapter 7 for the Industrial and lessor reaction to this hypothesis.

bridging the gap between long and short-term credit (and confirming CLARK's comment, see footnote page 45), there is no reason to suppose that this was the dominant motive. Indeed, in one respect, leasing runs counter to conventional Banking practice in that it subjects the Bank to the following risks:

"With five year leases common and longer ones by no means unusual, banks are effectively lending money against a fixed stream of repayments for a longer period than they might be willing to go on a straight loan. Since it would be unusual[1] for a bank to match a lease by borrowing long-term money at the start, it is exposed to all the risks of rising interest rates in the same way as anyone who borrows short and lends long".

GEDDES [60 ,p301]

If we observe the fluctuations of the Bank of England minimum lending rate over the ten year period 1965-1975 we note a decline in the rate during 1972 followed by an unprecented rise; doubling within the space of a few months in 1973 due mainly to the Middle East crisis. SHELDON [124,p645] and GEDDES [60 ,p299] point to the problems of borrowing short and lending long during such periods. Without doubt this has been a major influence upon the poor profit performance of many U.K. lessors, especially when one considers that the common philosophy of lessor financing is to match a five year lease with 'three

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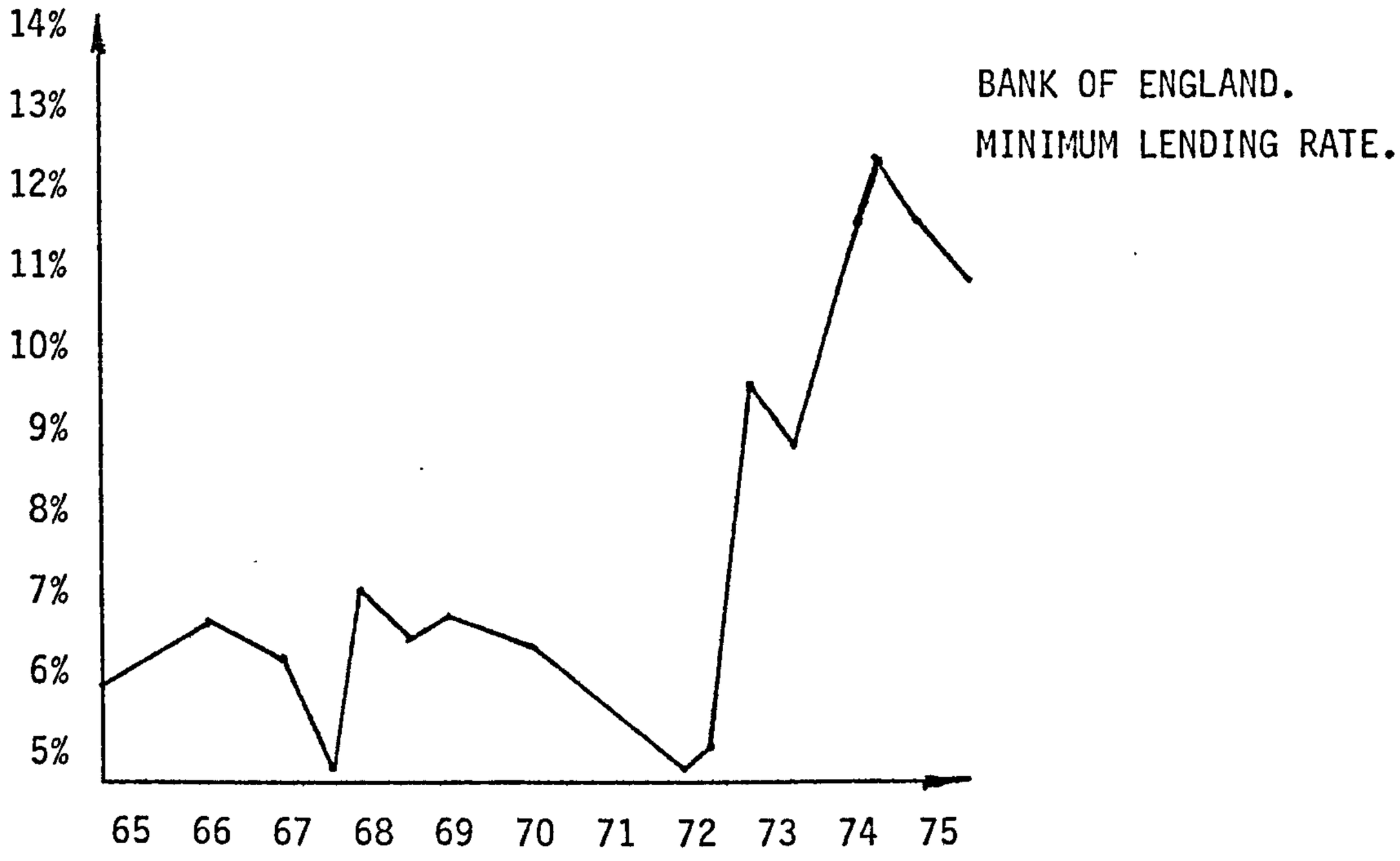
1. Exactly why it would be unusual is not explained further by GEDDES. We will return to the composition and make-up of the lessors "money book" in Chapter 7.

year money': a debt raised for a three year period.



1.9 THE PROFITABILITY OF LEASING FOR THE LESSOR

Three exogenous influences which affect the ultimate financial viability of a lease contract to the lessor, have now been discussed: viz, the rate of corporate taxation[1]; the level of interest/rental charges and the type of funds used by the lessor; and, finally, the size and periodic structure (ie. 100% First Year Allowances) of Capital Allowances and investment grants. The demonstrable variability of these factors has placed a collective pressure on the profitability of the leasing industry.

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1. Taxation and tax management will be returned to later: see Chapter 5.

"Margins are not high in the leasing sector ..... which makes for a poor return on capital employed. Too much leasing has been done for seeking taxation advantages, rather than profit, and this may prove to be costly with today's high interest rates".

GREENE & CO [63 ,p35]

The financial press often refers to the above as "negative leasing", which is briefly discussed in the following section.

Negative leasing

It is generally recognised that the U.K. banking system has been a highly successful and profitable sector of the economy. It is possible to conjecture, therefore, that the banks would actively seek appropriate methods to diminish their consequent extensive taxation liability. In an effort to reduce this burden the banks adopted leasing as a tax shelter: using the Capital Allowances obtained from their ownership, via subsidiary companies, of the assets which they leased out, to significantly reduce their group tax liability. That the leases themselves should be profitable was in practical terms of less financial consequence than the tax savings effected.

It has been suggested[1] that because the tax advantages of leasing were so obvious and lucrative the lessors were willing to issue contracts which, when considered in isolation, appeared to produce a loss .....

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1. See SHELDON [124] or ARTHUR, YOUNG, McCLELLAND and MOORES [5]

hence the term "negative leasing". The lessor was prepared to accept this loss on the face value of the contract on the implicit understanding that the group's overall tax liability would be sufficiently diminished, thereby making the amalgamated effect worthwhile.

It has proved difficult[1] to gauge with any accuracy whether or not this approach is truly indicative of a lessor's commercial strategy (it may be surmised, on the basis of personal conversations with lessors, that such action is extremely infrequent today). However, in the early days of the industry it does seem plausible that the tremendous inducement to tap these substantial resources of tax shelter may have led certain lessors to such action; even if the subsequent 'profitability' for the leasing company was poor. The motive to minimise the parent company's tax liability perhaps proved too much of an incitement; which in the end made leasing, prima facie, a low profit activity. Its true but unrecorded profitability lay unattributed within the parent bank's taxation accounts.

For what it is worth in the light of the foregoing, the report of GREENE & CO [63] gives us something of a more comprehensive picture of the profitability of a selection of U.K. lessors. Extracting some of the more relevant data covering the period 1972-1973, we observe:

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1. Both GREENE & CO [63] and ARTHUR, YOUNG etc [5] found that such a practice existed, but lessors were reluctant to reveal the extent of this approach in their leasing operations.

TABLE 1.2.

A SAMPLE OF LEADING LESSORS	BOOK VALUE OF INVESTMENT IN LEASED EQUIPMENT	LEASE INCOME	LEASING RETURN[2]	PRE-TAX PROFIT	PROFIT MARGIN
	£M	£M	%	£M	%
MERCANTILE[1]	69	18.5	26.6	1.4	2.0
COMPUTER LEASING	65	18.6	28.8	5.5	8.2
LLOYDS & SCOTTISH	59	11.2	19.0	3.0	5.1
HAMILTON	24	7.0	29.2	0.7	3.1
U.D.T.	21	5.5	26.0	0.3	1.6
WILLIAM BRANDTS	18	3.7	20.2	0.1	0.5
FORWARD	16	2.8	17.9	0.3	2.0
BOWMAKER	15	3.3	21.8	0.7	4.9

Table 1.2. clearly indicates the quite precarious profit margins earned by the lessors; and no doubt over the intervening period since this table was compiled the margin will have been further eroded due to the increased burden of interest charges.

To a large extent the profit figures are distorted by the "Rule of 78" method of accounting for profit by the lessors (see Chapter 2). This method is widely adopted in the U.K., but unfortunately it has the side effect of reporting losses during the early years of the lease contract.

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1. Now gone into liquidation.
2. Leasing return = Leasing income divided by gross book value of equipment

This problem has been most acutely felt by lessors whose asset base has expanded rapidly during the past years as more business has been undertaken: their growth seemingly resulting in larger losses -- due perhaps as much (or more) to an accounting system as to economic reality. When the lessor is a subsidiary of a Bank or Finance House this must concern management greatly: their efficiency and acumen is brought into doubt, with potential adverse reaction in both personal and company terms. Certainly it does seem that at the time of writing, the pressure from parent companies upon their leasing subsidiaries to make a trading, as well as a fiscal, contribution to the group (which is itself a significant indication of a changed economic climate for the banks), is resulting in a considerable emphasis being laid upon systems of accounting for leases in the books of lessors. This is discussed further in the next Chapter.

If Table 1.2. is reconsidered the following question may be posed: to what extent is the poor profit record of the industry a product of excessive, perhaps even unnecessarily excessive, rate cutting? Such rate cutting would take the form of offering contracts at low rentals. Besides the taxation motive previously outlined there are two further possible reasons to explain the lessor's action: firstly, a natural anxiety to establish leasing as a widely used and accepted system of corporate finance; and secondly, to promote their own position within the industry. The impact of setting uneconomically low rentals would be two fold: profitability would be depressed and cash-flow (liquidity) prejudiced.

How are lease rentals calculated? According to discussion with several lessors and the E.L.A., there are ten principal areas to be considered

when determining the size and pattern of a financial lease repayment schedule[1], (the order is in no way indicative of their importance):

1. The cost of the asset, and the date when the lessor must pay the manufacturer of the equipment.
2. The availability of any Government grant for the special location or industrial circumstances of the lessee which in the first instance will be paid to the lessor. Concern is also given to the exact timing of the grant and whether the conditions under which the grant is made require that it is to be transfered in a single sum or whether it may be spread out over the life of the lease.
3. The situation prevailing in the money market when the lease is being negotiated: that is, whether the lessor may use long, medium or short-term funds[2]; the level of the rate of interest; and the possible impact of any future changes in the cost of money upon the lessor's profitability and cash-flow situation.
4. Overhead costs: those incurred in the routine credit status investigation of the lessee; collection and processing of rentals; preparing and handling of documents and legal contracts; staff and building costs; etc.

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1. The cost of an operating lease will not be considered in this thesis. Suffice it to say that it is determined principally by the cost of the asset, by consideration of the length of the initial lease, by the anticipated second hand value of the asset and by expectations about its potential for re-leasing after the first lease is terminated.
2. During 1974, for example, many lessors remarked that it was almost impossible to obtain funds in excess of a 3 year term. As a result of the prevailing uncertainty lessors have been forced into much shorter term money than they would like ..... with the inevitable consequences in a rising interest rate market.

5. Profit.
6. The profit margin should include a small element to cover the statistical probability of one of the lessee's defaulting on a contract. If the lessee is forced into liquidation it may be sometime before recovery of the remaining payments is made.
7. The current and anticipated level of Corporation Tax and the timing, incidence and size of Advanced Corporation Tax.
8. If there should occur any undue lapse of time[1] between the payment for the asset by the lessor and the receipt of the Capital Allowance, or if there is a delay in the arrival of any rentals, both of which are not incorporated into the appropriate year's tax accounts, then the overall benefit of tax deferment by the lessor will be diminished and his profit will suffer correspondingly.
9. The possibility that, at some future date, a tax liability will occur because an excess of Capital Allowances has been accumulated by the lessor which is above that which group tax profits can absorb. This may has been caused by an unexpected decline in the taxable profits of other sectors of the group.
10. In a period of high inflation the lessor must consciously build into the level of lease charges a factor which will compensate for the decline in the purchasing power of money over the period of the contract.

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1. Recent information received (Aug. 1975) would suggest that many U.K. lessors are currently undertaking leasing business which, because of their fully absorbed tax position, will not receive immediate and full benefit of the 100% first year capital allowance. As such, rentals are being calculated on the assumption that the lessor will only be able to absorb, say, 50% of the maximum amount in the first year of the contract.

To what extent the lessor has failed to handle this interactive package of parameters in an optimal manner, and as a direct consequence suffered poor profit levels, is impossible to say.

The leasing industry is too young and fragmented to permit any strong inferences to be drawn from the data that is available -- and it will surely be realised that the relevant data which comprise the necessary homogeneous population of lease contracts is not available. The subject matter is too confidential; and the attribute of leasing that "it can be tailored to your circumstances" mitigates against homogeneity.

That so many decision parameters should be recognised by leasing management is mildly encouraging: but recognition and application may be unrelated given variations in human skills and the pressures of a very competitive market. For leasing management the problem is three fold:

(i) To correctly quantify the parameter values in the present economic and legal climate;

(ii) To correctly estimate their future values and the timing and scope of their impact upon leasing contracts drawn up now; and,

(iii) To optimally combine these present and future values in determining rentals.

It is not difficult to draw up models to effect a solution to (iii) in the context of assumptions about current conditions and values. It is, however, much more difficult to quantify actual values, and to define actual conditions of law, taxation and the like for any time

horizon beyond a short period hence --- the longer the lease contract, the more reliance is placed on estimates and the greater the possibility of serious error.

Because of the previously discussed ambiguities currently existing in the reporting of lease profitability the true position remains unclear: is the industry profitable or not? Has leasing management been successful or not? Until an accurate and equitable method of accounting is defined these questions will remain unanswered. In the meantime the situation is unresolved and the true circumstances can only be speculated. Such evidence as there is, and such conversations as have been entered into, lead to a moderately pessimistic conclusion.

1.10 CONCLUSION

As one of the principal sources of short to medium-term Instalment Debt available to the U.K. corporate sector, leasing has gradually emerged with a most impressive growth record to firmly establish itself as a new and increasingly prominent tool of financial management. Leasing is no longer (if it ever was) "second class" financing, but is actively engaged in by a wide variety of industries as an integral part of their corporate financing strategies.

In an endeavour to chronicle the relevant fiscal changes that have taken place since the introduction of leasing into this country, the fundamental issues and events which it is felt have contributed towards its growth and maturity have been considered. For the lessor it has been argued that the pace of development owed a great deal to the U.K.'s particular system of Corporation Tax ..... with the banking sector becoming increasingly influential in the field so as to secure the tax concessions which leasing brings through the medium of group relief. For the lessee, it has been suggested that their use of leasing may have developed for three (as yet unsubstantiated) reasons:

1. As part of a defensive strategy when other suppliers of credit had been reluctant to increase or renew their financing commitment; 2. As a taxation strategy, and; 3. As part of the overall financing policy of the company. In subsequent Chapters of the Thesis, opportunity will be taken to explore further the lessee's motives for leasing.

Although it has been stressed that within the U.K. the leasing industry has received a substantial fillip from the tax system, there is conspicuous evidence to suggest that it also has a more general and equally strategic rôle to play in corporate finance. France, Germany, Benilux,

and the U.S.A. have all seen spectacular growth records in the use of leasing. Yet it is to be noted with interest that none of these countries have investment incentives (such as a 100% First Year Allowance) as generous as the U.K. In these countries the lessor's chief fiscal advantage lies in his ability to depreciate the asset over a shorter period than would normally be the case.

Finally, the profitability of the leasing industry was considered. The data that was available proved to be somewhat equivocal due to the methods of accounting currently being used by U.K. Lessors. This important topic is now discussed further in the next Chapter.

CHAPTER 2

SOME OBSERVATIONS AND COMMENT ON THE PROPOSED 'INVESTMENT PERIOD' METHOD OF ACCOUNTING FOR EQUIPMENT LEASES BY LESSORS OF INDUSTRIAL AND COMMERCIAL EQUIPMENT IN THE UNITED KINGDOM

2.1 INTRODUCTION

At the time of writing the Accounting Standards Steering Committee of the Joint Accountancy Bodies of the U.K. (henceforth, the ASSC) is considering the problem of an appropriate technique for the reporting of profits by lessors of industrial plant and equipment. In June 1974, the E.L.A. submitted a report on this topic [43] suggesting that the "Investment Period" method of accounting for the profitability of a lease should be adopted as the appropriate standard in the accounts of the lessor.

Arguably[1] there are certain fundamental problems associated with the implementation of this method. As such, the purpose of this Chapter is to review the proposals put forward by the E.L.A.

2.2 CURRENT 'ACCOUNTING FOR PROFIT' PRACTICE - - U.K. LESSORS

In its report the E.L.A. gives details of how its members report profit on financial leases and how they record depreciation on the assets so leased. The most common method of recording profit in the statutory accounts is by taking primary rentals to the P. & L. a/c evenly over the life of the asset. The most common practice of providing depreciation is via a form of the "sum of digits" basis. Thus, depreciation is provided: "as the sum equal to the balance of each primary rental, after deducting earnings (defined as: primary rentals less the cost of the asset) calculated on the 'sum of digits'

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1. This Chapter is partially drawn up from two sources: (i) a first paper by myself submitted to the E.L.A. and subsequently to the ASSC [129] which presented the initial thoughts and doubts on the problem of double counting (a topic to be discussed later), and (ii) a paper by R.A. FAWTHROP [47], submitted to the ASSC, which was based upon our joint discussions and upon an initial draft prepared by myself. Full permission has been given by Prof. Fawthrop to include part of this second paper in this Chapter of the Thesis as it represents a substantial amount of my own research and thinking. I have followed the main line of thought developed in the Fawthrop paper, enlarging arguments where necessary and included the section 2.10, "Portfolio of Leases" which did not appear in either paper.

basis." [43 ,p6]. The lessors responded to the E.L.A. survey as follows:

	How taken	
	evenly	sum of digits
primary rentals to profit	16	3
depreciation policy	straight line: 4	sum of digits: 12 + 3

The E.L.A. considers there to be serious deficiencies in both accounting methods (almost to the point of considering them as unrepresentative of 'true' business profitability, see footnote, p67):

> "The 'straight line' method of releasing primary rentals and charging depreciation to the profit and loss account produces results which bear no relation to the actual profits earned from the lease except in total when the lease has run its full term. The main distortion arises because high interest charges are incurred at the beginning of the lease and are not spread evenly over the whole period. The 'sum of digits' method of accounting overcomes this distortion in part by releasing a higher level of net income at the beginning of the lease to compensate for the higher levels of interest charges incurred. It is an unsatisfactory method of equalising income with interest charges." [43, p10]

2.3 THE INVESTMENT PERIOD METHOD -- INTRODUCTORY COMMENTS

In view of the problems[1] outlined in section 2.2 the E.L.A. has devised the Investment Period method which adopts as its main principle that:

> "Gross earnings, being the excess of total lease rentals over the cost of the asset, should be taken to profit in direct relationship to the reducing capital invested in the equipment during the lease period."[43, p8].

To this end, total gross earnings are:

> "Apportioned to the accounting periods in the ratio that the cash invested at each rest (each accounting year end) bears to the total cash invested at all rests during the accounting period. Total gross earnings are thus spread over the investment period only."[43, p8].

Prima facie, the Investment Period method appears to be an unexceptionable approach. In what follows it will be argued that this approach is not necessarily 'wrong': but that for it to be 'right' implies an acceptance of a set of axioms about the nature and financing of a leasing organisation which may, or may not, be an accurate representation of what happens in practice within an individual organisation ... several shades of grey will be seen to exist which could prejudice the accuracy of the method.

> This is not an unusual characteristic of accounting procedures - - - current controversies over accounting axioms, principles, postulates and conventions are, after all, the raison d'être of the A.S.S.C.

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1. As was noted in Ch. 1, 1.9, the leasing companies have found themselves in a distressing situation recently: they have grown quickly, issuing presumably profitable contracts, yet they have been showing a rapidly deteriorating profit position, which in some cases has been a loss. The profits from previous and current contracts continue to be 'swamped' by the heavy initial interest and set-up cost of new business. Managerial concern to

(cont. →)

The need for flexibility in accounting standards is well argued, at any rate up to the point of permitting presentation of accounting statements which reflect genuine differences in underlying economic circumstances: yet not to the extent of facilitating the disguising, or the evasion of disclosure, of relevant economic circumstances however unpleasant. In order to safely walk the narrow path between, requires the detailed specification and understanding of a set of axioms -- particularly, the ground rules about the nature and financing of the economic entity now being accounted for -- which management of the entity can adhere to, can be consistent with, in their accounting procedures. Any standardised method of accounting for equipment leases must reflect both the same judicious tolerance for the genuinely different and that same responsible care for the materially truthful -- which must likewise be founded upon a set of commonly understood axioms about the nature and financing of the organisation now in report. Thus, the following argument is central to our discussion in this chapter.

> What does the Investment Period system appear to be telling us about the nature and financing of leasing companies: and does that accord with the way they really are?

As will be apparent in the later Chapter containing a discussion of a survey conducted with several U.K. lessors, see Chapter 7, it must be admitted at the outset that it is very difficult to determine, "the way

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(cont.):
make the accounting system more 'representative' (i.e. show profits earlier) has been all the more keen in recent years with interest rates and overhead burdens rising sharply.

they really are" in an industry where its members are acutely aware of their competitive position and extremely sensitive to the disclosure of confidential information which may prejudice their position. As with any other economic organisation a definitive statement on policy (or profitability; which is frequently well hidden within the parents accounts) is largely a question of who one is talking to, and the degree of mutual respect as to confidentiality. However, an accounting system or method is usually constructed for the purpose of either score-keeping and reporting, for controlling, or for providing information with which to make decisions. Occasionally, the same system or method is sought to be used for two, or perhaps all three, of these purposes - - usually with less than satisfactory results and at a cost of much misunderstanding. It appears that something of this trauma seems to be pervading discussions of the Investment Period system of equipment leasing accounting: during recent discussions on the subject with various members of the E.L.A. it has been described with equal positiveness as:

"A technique of management accounting for internal decision-making"

and also as

"A method of measuring (and reporting) profits from equipment leasing".

This divergence of opinion, and its implications, will be returned to later; noting for the present that there does appear to be a reasonable amount of misunderstanding and perhaps misplaced emphasis and critisism in the discussion of the system.

BROWNING [25, p10] does, however, make a significant contribution to clearing up these misunderstandings when he comments:

"It will be appreciated that the underlying philosophies of the Actua-

rial Method[1] and the Investment Period Method are different, as the Investment Period method does not make cash (i.e. earnings) available to the lessor for alternative uses (e.g. payment of dividends, investment in new projects, etc.) until the end of the life of the lease. In this case, therefore, the cash is not released but is retained within the lease to artificially depress the market borrowings necessary to support the lease itself." (emphasis supplied).

It is hoped that the ensuing discussion will show that this statement contains a considerable amount of truth: acceptance of the Investment Period system must depend upon whether or not one accepts as an axiom of the nature and financing of leasing companies that "to artificially depress the market borrowings necessary to support the lease itself" is IN FACT "the way they (the nature and financing) really are". External observers of the industry may question this --- these doubts will be further considered and outlined in this Chapter and the subsequent Industrial Survey.

Arguably the problem is rather more complex than even BROWNING's comment implies. To demonstrate this it will be necessary to construct an illustration and then to analyse the implications.

2.4 A PURE DISCOUNTING APPROACH

An asset costing £ 2000 (outright purchase price) is the subject of a leasing contract consisting of a primary period of five annual payments of £557, followed by a secondary period of annually renewable negligible amounts. "Gross Earnings", as defined previously, are thus (5 x £557)-£2000= £785. The asset attracts a full 100% first year allowance which

1. This is basically a discounting approach, discussed later.

the lessor may absorb in total during the first eligible year, and Corporation Tax is expected to remain at 50% throughout the period, with the lessor paying tax at the full amount.

THE FOLLOWING CONVENTIONS[1] ARE USED:

1. (i) Rentals are annual, and payable in advance. The use of annual amounts simplifies computation, compresses tabulation and highlights problems of cash-flow timing.

   (ii) Receipt of the first rental is co-terminous with payment for the asset.

2. Payment of taxation, and receipt of tax relief, takes place on assessment to tax. Assessment is effected on January 1st next following the end of the fiscal year within which the accounting year ends. First-year allowances relate to the accounting year within which the asset is first brought into service. The accounting year ends on 31st December.

   This specific assumption must be made regarding the receipt of tax allowances and the payment of corporation tax: the following sequence of events causes the two year delay shown in the subsequent Tables - - for tax purposes the first lease is commenced by the company at t=0 (date 1.1.x1) and will be recorded in the accounts at t=1 (1.1.x2), tax will then be paid on this amount at t=2 (1.1.x3). This convention is typical of those used in all project appraisals (although in the subsequent survey of the literature on leasing, this

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1. To identify, quantify and date exactly each variable in the analysis (such as a series of tax payments) is laborious and may introduce a random bias. A set of standardised assumptions, or conventions, is therefore made which is a reasonable approximation to the facts of the case but which avoids these difficulties.

very important two year delay - - as opposed to the standard one year delay - - is frequently overlooked, with significant effects on the discounting process). In practice the lease may not always commence at exactly t=0, or the start of the accounting period, it is then accepted accounting procedure to apportion the tax burden to the appropriate years. A similar argument (i.e. a two year delay) may be constructed for Capital Allowances.

This convention is less pedantic and more practically significant than it might seem. The Investment Period requires that interest be computed from time to time on the residuals of capital, net of taxation, amounts. It is, therefore, extremely important to date precisely the receipt or payment of taxation amounts so as to calculate the interest. Further: it is of considerable importance in that the period (year-end) reporting of data at a particular time will demand a knowledge of what taxation items to include or exclude. The full significance of these points will be demonstrated later, but it serves at this time to emphasise how an accounting method can "appear to be telling us about the nature and financing" of the organisation.

It should also be noted that this particular tax convention sets an accounting year-end at December 31st and taxation cash-flows, relating to the previous accounting year, on January 1st.
In the Investment Period method the two dates are separate; but in any method which utilises discounting, AS DO THE VARIOUS ACTUARIAL METHODS, the two dates are the same for all practical purposes.

Consider year-end data at 31-12-x1 and a tax cash-flow at 1.1.x2. In the Investment Period analysis the two would appear in separate data columns: but as the discount factor at 31.12.x1, is for any realistic rate of interest, virtually indistinguishable

from that of 1.1.x2 both dates would be regarded as co-terminus for actuarial purposes. However, over periods as long as one year, the results of this difference in treatment upon calculations of capital recovery and income (profit) can be significant.

3. All cash-flows are assumed to be discrete amounts occurring at year-ends or year-beginnings. A different tax convention would nullify this.

4. All interest amounts are discrete year-end computations. Continuous compounding might be more realistic, but not greatly so - - and in the context of the problem at hand it is much less useful or familiar to the ultimate uses of the accounting system.

The cash-flows of the contract may be depicted as follows:

TABLE 2.1

LEASE CONTRACT DATA (£)

DATE OF CASH FLOW: 1.1.x1	1.1.x2	1.1.x3	1.1.x4	1.1.x5	1.1.x6	1.1.x7
NAME OF CASH FLOW						
LESSORS PURCHASE COST OF THE ASSET. (2000)						
LESSORS RECEIPT OF RENTALS. 557	557	557	557	557		
50% CORPORATION TAX ON RENTALS.		(278)	(278)	(278)	(278)	(278)
FIRST YEAR ALLOWANCE (100% @ 50%).		1000				
AGGREGATE CASH-FLOW (1443)	557	1279	279	279	(278)	(278)

(Bracketed figures are cash-outflows from the lessor)

To clarify subsequent analysis it will be convenient at this point to establish equivalent time periods (thereby clearing up what may have been some confusion in Assumption 2 above):

TABLE 2.2

CASH-FLOW DATA (TABLE 2.1)	EQUIVALENT DATE FOR DISCOUNTING PURPOSES	DISCOUNT PERIOD "t"
1.1.x1	31.12.x0	t=0
1.1.x2	31.12.x1	t=1
1.1.x3	31.12.x2	t=2
1.1.x4	31.12.x3	t=3
1.1.x5	31.12.x4	t=4
1.1.x6	31.12.x5	t=5
1.1.x7	31.12.x6	t=6

A capital recovery table[1] may now be computed using an interest rate of 20%.

TABLE 2.3

CAPITAL RECOVERY IMPLICIT IN THE LEASE (£)

DISCOUNT PERIOD "t"	CAPITAL OUTSTANDING AT START OF PERIOD "t"	INTEREST on OUTSTANDING CAPITAL AT 20%	CAPITAL + INTEREST DUE AT END OF PERIOD	CASH-FLOW IN PERIOD "t"	CAPITAL UNRECOVERED AT END OF PERIOD "t"	CAPITAL RECOVERED DURING PERIOD "t"
0	(2000)		(2000)	557	(1443)	557
1	(1443)	(288)	(1731)	557	(1174)	269
2	(1174)	(235)	(1409)	1279	(130)	1044
3	130	26	156	279	123*	253*
4	123*	24	147*	279	426*	303*
5	426*	84	510*	(278)	232*	(193)
6	232*	46	278*	(278)	0	(232)

Up to the end of period 3 the project still has capital to be recovered; in period 3 there is an over-recovery of £ 123 (as indicated by the asterisk). Consequently, in period 4 there is a surplus (asterisked) rather than an amount due at the period-end, which gives rise to an even larger over-recovery (asterisked). This pattern is repeated in period 5, but the negative cash-flow of that period reduces the over-recovery with the negative cash-flow of period 6 completing the process to leave a NIL under or over-recovery.

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1. This table, and the following Table 2.4, together with subsequent discussion on the "reinvestment assumption" are based upon pages 191-194 of FAWTHROP [45].

Table 2.3 demonstrates that the contract has a yield[1] of 20%: if the period cash-flows were discounted at 20% there would be a zero net present value. FAWTHROP [45 ,p193] has demonstrated that each period cash-flow can be split up into a yield (income) element equal to 20% of the capital remaining in the contract at each period rest (thus matching income to investment - - - one of the desired principles of the Investment Period, see Section 2.3), plus a capital recovery or depreciation, viz.:

TABLE 2.4
THE INCOME FRACTION AND DEPRECIATION FRACTION OF CASH-FLOW (£)

Discounting period "t" / Accounting year end 31 Dec.	0 19x1	1 19x2	2 19x3	3 19x4	4 19x5	5 19x6	6 19x7
Period cash-flow	557	557	1279	279	279	(278)	(278)
Divisible into:							
1. Capital recovery	557	269	1044	130			
2. Income		288	235	26			
3. Borrowing from contr.				123	303		
4. Interest thereon (loss)					(24)	(85)	(46)
5. Repayment to contr.						(193)	(232)
Capital invested during period	1443	1174	130	0	–	–	–
Income as a% thereon*		20%	20%	20%			
Capital borrowed				122	425	232	0
Loss as a% thereon *					20%	20%	20%

x This is established with reference to the capital base in previous year.

This is a strict 'pure' discounting approach. It has the special characteristic that the income (or loss) is computed at the true yield inherent in the terms of the lease contract and its related tax conventions.

From the income there may be deducted the normal costs of operation such as

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1. Technically, the cash-flow profile of this project, with its switch from negative to positive to negative again, is a "non-simple, mixed" profile from which it may be erroneous to derive a yield in the manner demonstrated. This is, however, a somewhat sophisticated aspect of discounting mathematics which we may ignore in the present context.
See Chapter 8 for a full discussion of this problem.

overheads, provisions for bad debts and the like. There would also be a corresponding addition to the latter period's 'loss'.

Additional points of importance are:

1. By 31.12.x4 the initial capital outlay of £ 2000 has been fully recovered and a surplus cash throw-off accrues to the contract. This increases in the following years but because of the negative cash-flow occurring in the final two years the throw-off is reduced to zero.

The life of the contract can be divided into two reference periods which will prove useful in the ensuing discussion.

THE CAPITAL DEFICIT PERIOD[1] which relates to those periods prior to the surplus cash throw-off, and

THE CAPITAL SURPLUS PERIOD which runs from the end of the capital deficit period until the termination of the lease (i.e. all the subsequent periods)

2. Totally implicit in this approach is that the depreciation fraction (capital recovery) is taken out of ("borrowed from") the contract and <u>reinvested at a rate not less than the true yield on the contract</u>[2]. This is the "Reinvestment Assumption" implicit in all discounting procedures (see footnote p. 74).It will be noted that positive capital recovery will <u>only</u> occur in the CAPITAL DEFICIT period. Therefore, a point is raised here for the reader to bear in mind subsequently: the reinvestment of the cash-flows occuring in the CAPITAL SURPLUS period will be seen to be fundamental to the methodology and workings of the Investment Period method. The present, 'pure discounting' method implies

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1. This corresponds exactly to the length of the Investment Period (outlined shortly).
2. Reinvestment earnings up to that rate are then imputed back to the contract ('lost' to the firm) which otherwise would yield 20%.

that leasing companies do reinvest the depreciation fraction implicit in the lease rentals -- it "says something about the nature and financing of leasing organisations". But note the conflict between the, as yet to be discussed, Investment Period method's desire to reinvest the cash-flow (in full)[1] which occurs in the CAPITAL SURPLUS period, and the pure discounting method which only reinvests a fraction of the cash-flow and then with greatest impact in the CAPITAL DEFICIT period.

3. FAWTHROP [45, p193] shows that capital recovery (depreciation) is a "true economic depreciation" -- it is the change in the earning power of the contract at each period rest, as measured by the present value of the contract at each period end. This approach has considerable affinity to the method proposed by MYERS [107], differing only by the discount rate used[2].

MYERS suggests a modified form of the after-tax cost of debt, which may well be different from the internal yield used here.
The cost of finance would be a further deduction from "income" in the present method, and a reduction of the "loss", in as much as external market borrowing costs would be avoided by using the "depreciation fraction" of the contract for further operations (re-investment in other leases). The discounting approach also has the virtue of spreading the gross income over the contract life in a logical manner rather than that "by some rule or other", MYERS (op cit.)

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1. Subject to certain deduction see Table 2.5.

2. As will become obvious in the Chapter dealing with the previous literature on leasing, the question of the "correct" discount rate is a thorny problem. MYERS' contribution to the current debate is based on another article of his, namely [106]. It is considered premature to raise the full issue of this paper at this stage of the Thesis, see chapter 6.

4. The discounting approach is, as MYERS remarks, an "ideal" approach. Computationally it is not especially difficult and it has the virtue of being based upon strict economic logic. It is related to cash-flow rather than accounting values -- vide especially the computation of depreciation. It is also a type of Actuarial calculation and, as such, MYERS' preference for the Actuarial alternative in the E.L.A. submission is understandable.

The discounting approach has proved valuable as a means of exploring the economic nature of a leasing contract. From this basis it is now possible to fully discuss the implications of the Investment Period.

2.5 THE INVESTMENT PERIOD APPROACH --- AN EXAMPLE AND COMMENT

The following tables (2.5 to 2.8) purport to apply the Investment Period approach to the exemplar leasing contract (and its associated conventions as previously described) utilised in the preceeding section. This presentation is somewhat different from that demonstrated in the E.L.A. submission -- in particular annual rests are used by way of simplification -- but it is believed to contain all the principal features of the approach.

(i) It should be noted that in this presentation the cost of borrowing (raising funds to finance the lease) has been taken as 10% per annum pre-tax.

(ii) The point of translation from CAPITAL DEFICIT to CAPITAL SURPLUS is in the period market with an asterix; although in fact the amounts of CAPITAL SURPLUS and DEFICIT are really an aggregate of capital and interest, both adjusted for tax

(iii) This example shows two periodic rests in CAPITAL DEFICIT, the amounts of capital outstanding in these periods are £ 1587 and £ 1133.

TABLE 2.5

THE INVESTMENT PERIOD METHOD OF ACCOUNTING (£)

ACCOUNTING YEAR–END (31 DEC)			19x1	19x2	19x3	19x4	19x5	19x6	19x7	19x8
No.	NAME	DATE								
1	Amount Outstanding	Jan 1	(2000)	(1587)	(1133)	240	627	984	746	454
2	Rental Received	Jan 1	557	557	557	557	557	–	–	–
3	Pre-Tax Outstanding Investment	Jan 1	(1443)	(1030)	(576)	797	1184	984	746	454
4	Tax charge on rent received	Jan 1	–	–	(278)	(278)	(278)	(278)	(278)	–
5			(1443)	(1030)	(854)	519	906	706	468	454
6	Tax Relief (charges) on interest on o/s investment as per item No. 10	Jan 1	–	–	72	51	(11)	(28)	(45)	(34)
7			(1443)	(1030)	(782)	570	895	678	413	421
8	First year allowance	Jan 1	–	–	1000	–	–	–	–	–
9	Net-of-Tax outstanding investment	Jan 1	(1443)	(1030)	218*	570	895	678	413	421
10	Interest thereon at 10 percent	Dec 31	(144)	(103)	22	57	89	68	41	42
11	Amount outstanding	Dec 31	(1587)	(1133)	240	627	984	746	454	463

Four major differences may be observed between Table 2.3 and 2.5

1. Table 2.3 is computed on an internal yield basis -- it is self-consistent. Whereas, Table 2.5 requires the introduction of an exogenously-determined "cost of funds" (here 10%) which may or may not be consistent with the "yield to funds" (here 20%).

2. Table 2.5 is also open to the charge that it embodies an element of "double counting"[1] -- subject to certain conditions to be outlined shortly. From Table 2.3 it will be noted that the rentals received were broken down into their constituent elements of interest and capital recovery. Prima facie in Table 2.5 (but not incontrovertibly -- there is an element of doubt as to the true "nature and financing" of the organisation) the rental for, say, 19x3 is used wholly to reduce the capital investment in the contract. This is then followed on line 10 by the imputation of a separate interest income of £ 22 to the lease contract ..... and so on in all the periods within the CAPITAL SURPLUS section of the lease. But surely the rental does include <u>all the income really attributable to the contract</u>, and to impute yet a further income to it is surely spurious?

   A measure of this double counting is indicated by the fact that the internal discount rate -- that which results in a zero present value over the 8 years -- on the data in Table 2.5 is close to 15%; yet Table 2.3 clearly indicates that the "true" yield of this contract is no more than 20%.

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1. An attempt to 'prove' this assertion will be made in a later section of this Chapter, see section 2.10.

3. Table 2.3, and its derivative Table 2.4, come to a "natural" conclusion when capital investment in, and borrowing from, the contract are just terminated by the interaction of rentals, taxation and interest cash-flows. It will be noted that Table 2.5 has no "natural" end -- presumably it could be continued to infinity or any arbitrarily determined shorter period. Here, the first clear year after completion of rentals receivable and associated tax liabilities has been chosen: but there is no apparently logical terminal period. It also presents us with the problem of 'explaining' the nature of the terminal cash-flow.

4. It is not immediately clear just exactly what has happened to the various cash-flows in Table 2.5 (-- perhaps, the nub of the problem). For example, in year 19x2, Table 2.5 shows all the rental for that year as a reduction in the investment in the contract (that is, capital recovery or depreciation is the full amount of the rental): yet, as will be seen, the linked Table 2.7 shows most of it to be income.

Table 2.5 also embodies a singular form of "reinvestment assumption": by comparison to Table 2.3 which deliberately re-invests the depreciation fraction, Table 2.5 "disinvests" the capital of the project back to the original financial source of the contract, and only re-invests the CAPITAL SURPLUSES in the later years. Thus, there is no guarantee that the project yield will be achieved if the reinvestment rate differs from (is lower than) the original project yield.

These differences will be discussed further below, meanwhile the Investment Period approach computations must be completed. The data of Table

2.5 can be applied as follows in accordance with paragraphs 12.1 and 12.5 of the E.L.A. submission:

Table 2.6

APPORTIONMENT OF GROSS EARNINGS

Accounting year-end Dec 31st	Amount invested at year end	Apportionment of gross earnings
19x1	£1587 = 58%	58% £ 456
19x2	£1133 = 42%	42% £ 329
	£2720 = 100%	100% = £ 785

and the results applied to the determination of a "depreciation" series:

Table 2.7

GROSS EARNINGS AND RESULTING DEPRECIATION CHARGE

Accounting year-end - Dec. 31st	Rental received in year	Gross earnings in year	Depreciation in year
19x1	557	456	101
19x2	557	329	228
19x3	557	-	557
19x4	557	-	557
19x5	557	-	557
	£2785	£785	£2000

Combining all the previous information the effect of this single lease contract on the "profit and loss" account of the lessor can be demonstrated over the life of the agreement, and beyond. NOTE that one of the inherent principles of the Investment Period method is that interest ("profit") will accrue to the lease cash balances once the contract has entered the CAPITAL SURPLUS PERIOD. Thus:

Table 2.8

PROFIT AND LOSS ACCOUNT(S); LESSOR

Accounting year-end 31st Dec.	Primary rentals received	Depreciation charged	Gross earnings	Interest charged/ credited	Profit/ (loss) prior to corp.tax
19x1	557	101	456	(144)	312
19x2	557	228	329	(103)	226
19x3	557	557	0	22	22
19x4	557	557	0	57	57
19x5	557	557	0	89	89
	£2785	£2000	£785	(£ 79)	£706
19x6				68	68
19x7				41	44
19x8				42	42
etc. *				etc. *	etc. *

(* without bound)

Table 2.8 especially brings out the arbitrary nature of the appraisal period. This is endemic in any investment appraisal study that does not have a finite and foreseeable "life". In the present case, the five years of the contract form such a "life" only if it can be ascertained clearly what happens to the cash-flows accruing during the "life" after the 5 years are terminated -- which is a function of the "nature and financing" of the organisation: a definite statement about the role or placement of the terminal cash-flow goes a considerable way towards determining the "life" of the study period. However, the E.L.A. submission is silent on this point; and there would also appear to be disagreement among some U.K. lessors who in discussion have stated it to be either a "reinvestment" into new leases or a "distribution" to the parent.

.6 DEPRECIATION POLICY

From the previous Tables 2.6 and 2.7 it is clear that the size and timing of depreciation is seen as a residual after gross earnings have been

apportioned to their relevant time intervals and deducted from rentals.

It is proposed here that depreciation would be more correctly established by reference to the actual loss-in-value-through-use of the equipment, which is after all the substance behind the lease. Given this, gross earnings would then appear as a residual. It is also suggested that loss-in-value-through-use would best be determined and related to replacement rather than historic cost; on the grounds of greater realism. But perhaps the system with most to recommend it would be a depreciation policy based on the change in income earnings capacity (i.e. the "economic depreciation" policy previously outlined in Tables 2.3 and 2.4) of the lease by measuring the change in the present value at each successive year end -- this is the pure discounting or actuarial approach. The argument for computing gross income and thus depreciation in the manner advocated is that this system matches earnings to investment.

The Investment Period method of reporting depreciation is potentially a most misleading and possibly hazardous system:

(1) The E.L.A. submission[43, p10]clearly indicates that the reported asset in the statutory accounts will be the depreciated value of the equipment. An examination of Tables 2.8 and 2.5 indicates that the reported earnings will in no way match the investment base. The desire to "front-end-load" the gross earnings from the lease seriously distorts any return to capital employed measurement.

(2) The proposed system recommends a re-allocation of total gross income into those accounting periods where the lease remains in cash deficit. As such, "Profit and Loss" is shown to be highest when the cash commitment is at its peak. If, as is to be commercially expected, the gross earnings generated by the lease will contribute towards some form of distribution to the parent company, then the Investment

Period method will encourage a distribution of cash at precisely the time when all the cash resources are tied-up in the on-going contract. This, basically, is an untenable position if the accounting principle of realisation and the accounting convention of prudence are to be recognised. It is vitally important to match distributions with cash-flow, but the Investment Period method fails to do this.

To continue with the previous discussion on the Investment Period.
As was noted above, a major difference between the discounting approach and the Investment Period approach is that in the latter there is no immediate indication of what happens to the cash-flow generated by the contract during its life time.

Evidently this issue of the destination of cash-flow generated by the contract is of major importance in understanding the Investment Period approach to accounting for leases. And insofar as this involves the question of whether or not such cash-flows are assumed to be reinvested, a second important issue must be the interest rate used in the appraisal -- which also was seen to be a major difference between the two approaches.

2.7 A "SINGLE VENTURE" OR A "REINVESTMENT" SYSTEM

INTRODUCTION

It is taken as axiomatic that:

Whatever method of accounting for equipment leases is used, it must be possible to reconcile the aggregate amounts of

interest charged and credited in the individual contract profit and loss accounts with the actual net payments or receipt of interest in the books of account of the organisation.

In fact, it would be possible to modify this requirement somewhat if

(a) the individual contract "profit and loss" accounts were to be used for internal decision making purposes rather than profit reporting, and

(b) senior management did not then attempt to aggregate these management accounts (which is what they would be) into financial position statements [1].

It is assumed that these two conditions are not what is envisaged.

At the heart of the matter is that the net receipts of, or payments of, interest in the books of account of the lessor will reflect the actual movements of funds -- how the organisation actually operates and what use it has made of its funds.

A priori, it seems possible that the following movements of funds could take place (against which net receipts and payments of interest could

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1. There does seem to be some confusion between proponents of the Investment Period system as to what ultimate use the appraisal method is to be put to. Both "management accounting" and "financial accounting" usages have been indicated in discussion. The E.L.A. submission itself talks about "accounting for leasing" without saying "accounting for leases to whom". If, in fact, what is envisaged is management accounting then much of the ensuing critisism is unnecessary (being broadly similar in nature to a lease appraisal technique which we shall introduce later in the Thesis). However, it may be noted that so far the ASSC has only been concerned with standards for external financial reporting. The critisism is thus couched on the assumption that the system is to be employed as part of the statutory accounts.

be reconciled):

MOVEMENT A As each lease contract is entered into, fresh ad hoc funds are raised to acquire the asset. As the rentals are received and the various tax and interest adjustments brought in, then:

(i) During the CAPITAL DEFICIT period, net receipts are used to retire those ad hoc funds -- the entire residual sum at each year end is set aside to retire the initial capital. The retiral is quite explicit (it is an actual, not notional, event). The cost of funds which still remain tied-up in the contract must of course be paid for, but there is a reduction in the tie-up.

(ii) During the CAPITAL SURPLUS period, net receipts are put into a separate bank account or other non-leasing non-capital redemtion investment. There they will be able to earn interest in a compound manner.

MOVEMENT B As movement A but with the following difference: during the CAPITAL DEFICIT period net receipts are put into a separate non-leasing, non-capital redemption investment -- the interest of which is credited to the contract, reducing the net interest charged to it during the deficit period.

MOVEMENT C During the CAPITAL DEFICIT period, the net inflows are used in the same manner as movements A and B. However, during the

CAPITAL SURPLUS period, net inflows are used to reduce the tie-up of capital in other existing (or about to commence) leasing contracts during their CAPITAL DEFICIT period.

MOVEMENT D As soon as any net inflows are received, i.e. whether our lease contract is in CAPITAL DEFICIT or SURPLUS they are used to reduce the capital tie-up in other existing contracts. It will follow, of course, that the contract will also be reciprocally relieved, which increases its ability to relieve even further, other existing contracts.

MOVEMENT E During the CAPITAL DEFICIT period, net inflows may move as in A or B. But during the CAPITAL SURPLUS period, net inflows are used to finance new, additional contracts.

MOVEMENT F As soon as any net inflows are received -- i.e. whether the contract is in CAPITAL SURPLUS or DEFICIT -- net inflows are used to finance new, additional contracts.

MOVEMENT G Only that part of the net cash-inflows representing the capital recovery, or depreciation (as per Table 2.3) is reinvested in new, additional contracts[1].

Other alternatives will occur to the reader, but these will suffice to illustrate different "natures and financing" of leasing organisations.

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1. This is the "idealised" discounting approach discussed earlier, with its implicit reinvestment assumption.

2.8 A SINGLE VENTURE SYSTEM

MOVEMENTS A and B are clearly "single venture" operations. There is NO transfer of funds between contracts WITHIN THE LEASING ORGANISATION. It would be possible in A for the lending organisation which provided the funds for each new contract to re-circulate redemption receipts back into its leasing subsidiary or client organisation. But so far as the lessor is concerned each contract is regarded, administered and accounted for as if it was a single venture in total isolation from its fellows. It would then transpire that the aggregate of interest payments, reductions in payments and receipts, recorded by accounting for each lease by the Investment Period method would exactly equal the net balance of interest receipts or payments in the books of account of the leasing organisation[1].

However, the key question may be posed: Does the movement of funds (depicted by types A and B) correspond with the "nature and financing" of leasing organisations in practice?

If so then:

(i) Leasing organisations will have an ever increasing balance of funds committed to, presumably external, non-leasing and/or debt redemption investments -- unless this is the source of dividends attributable to share capital at a rate exactly equal to the build-up of such investment.

(ii) A detailed observation of Table 2.5, in conjunction with movements A and B, raises the question of whether or not the initial capital for the lease contract resembles an overdraft in nature.

1. And, thus, Table 2.5 would be perfectly accurate and representative.

If we consider that the rate of reduction of this committment is not in any way contracted, but is dependent upon the size of the received rentals plus tax adjustments, then the repayment of the capital sum could be said to be at the lessor's discretion: the amount he repays will determine the level of interest he is charged. To that end there is, if nothing more, an implicit indication that the Investment Period method reflects a contract which is funded by overdraft.

It has been noted before in this Thesis (see Chapter 1, section 1.10) that in the recent past the leasing industry in this country -- together with other industrial concerns -- have been forced into what is (was) an almost total dependence on short term debt. The long term debt market currently being the subject of very high rates of interest.

While this is certainly an important, albeit temporary, phenomenenon, it would be safe to suggest that 5 years from now the debt market will have a different form and character than that observable today. Given this situation, where long term debt is available at 'realistic' interest rates, it will be prudent banking policy to employ a mix of long and short-term debt (thereby trying to avoid borrowing short and lending long).

Thus, the repayment of interest and capital on a specific leasing contract may bear little or no resemblance to the overdraft conscious/rapid repayment schedule depicted in Table 2.5. Thus, we may conjecture that if the accounting standard had been debated in a time when interest rates were different, then the E.L.A.

submission would have been constructed in a somewhat different manner. No account is taken of long term debt (or for that matter equity) in the proposed method.

(iii) Leasing organisations are in danger of being less than fully efficient. If the risk-adjusted rate of return on available and potential lease contracts is greater than the external non-leasing, non-capital redemption investment opportunities, then it would be inefficient to reinvest cash-flows outside the leasing business -- potential lessee's offer a return in excess of the external investment opportunity rate. Conversely, the organisation should not be in the leasing business if it could not at the very least match this yield. Only if the two rates coincide[1] is it correct to regard the two as economic substitutes for each other.

The third observation contains serious implications for the rate at which interest should be charged or credited to the individual lease appraisal under the Investment Period approach.

Should it be:

1. The market cost to the organisation of <u>borrowed</u> funds, as the E.L.A.'s submission suggests [43, p13]
2. Should it be the market costs of funds in general -- say the weight-

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1. In fact, as the operating costs of the leasing business probably exceed those of the management of a portfolio of equities and investments, the leasing yield, even after adjusting for risk, will need to show a premium over the yield on external investments. The reader is asked to note that "portfolio investment" should be understood to include keeping funds on deposit at a bank.

ed average cost of equity and borrowed capital?[1]

3. And in either case, should it be the market cost of existing or of new (incremental) capital?
4. Finally, should it be the market cost of funds at all?

It is argued here that it should not be the market cost of funds of any sort, rather, it should be the opportunity cost -- the yield that could be obtained from the best use of these funds.

However:

(a) If the "best use" is, in fact, the capital redemption or an external portfolio of investments, then why is the leasing organisation in business? Its prospective lessors must return a yield in excess of the "portfolio" yield.

(b) If the "best use" is reinvestment in further leasing business (up to the point where the yield on that further business is, after adjustments for risk and operating costs, just equal to the market cost of funds), then fund movements A and B are not the ones which apply.

We should note that if the organisation is IN FACT redeeming capital and/or investing externally, even though these are not the "best

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1. On the argument that funds can only be borrowed "on the back of" equity, the existence of which affects the rate at which borrowing can be effected, and the return of which is interactively affected by the amount and cost of borrowing (see Chapter 4). This can be distorted if a leasing organisation is a wholly-owned subsidiary of a bank, with a nominal amount of equity and virtually unlimited access to inter-company loans from the parent company. In that case the market cost of borrowing and the market weighted average cost of capital to the subsidiary are pretty much the same thing -- but they are not the same thing to the parent company who could find itself misled in its lending (to the leasing subsidiary) policy because of the use of a specific rather than an overall group cost of capital.

uses" possible of the inflows from the contract, then the use of a specific capital cost in the CAPITAL DEFICIT period is "correct" in the sense that it will reconcile with the books of account. However, it is not "correct" in the CAPITAL SURPLUS period if the yield on portfolio investment is higher than the cost of capital, for the books of account will report the yield actually received. Furthermore, we may raise the issue of economic efficiency in the use of capital yet again, for if the yield on portfolio investment is not higher than the cost of capital, then why is the organisation carrying out such investment?

Of course, the efficiency or inefficiency of the organisation is not the concern of the accounting system, which is concerned primarily to report "what is" rather than "what should be".

If funds movements A and B really are the "nature and financing" of the organisation, than the Investment Period approach to accounting for equipment leases is "correct" as defined. And on that assumption, the interest computations of Table 2.5 are correct.

The choice of the opportunity cost of funds as the reinvestment rate is bound up in the interpretation of what actually happens to funds within the leasing organisation.

If they do re-circulate within the company, and are put to use in further leases, than the yield they will obtain will be the average yield on the portfolio of leases currently undertaken by the lessor.

So far, a "single venture" leasing organisation has been considered with financial movements and policies in accord with assumptions A and B. What about the alternative movements?

2.9 A REINVESTMENT SYSTEM

Practically speaking, it must surely be impossible to identify whether funds move into (are reinvested in) existing, as opposed to further, leasing contracts; whereas it might be possible to differentiate between the utilisation of funds to reduce debt in the CAPITAL DEFICIT period and to reinvest in further projects in the CAPITAL SURPLUS period. However, this differentiation appears artificial. It would seem more plausible that the total of funds inflows, from all contracts at any one time, would be used to redeem a 'general' tranche of borrowed funds (rather than to attempt to redeem outstanding investments in specific contracts).

The reference to a 'general' tranche of debt would thus encompass both long and short term funds which were raised when the market was, perhaps, favourable, rather than a series of debt instruments brought in to equalise demand from the lessor's clients.

Applying the Investment Period approach to a reinvestment flow of funds generates a number of questions:

1. When are the funds reinvested

   (a) At what time during the contract period? There are several alternatives to this question: As soon as the inflows are received (Movements D and F); as soon as the CAPITAL SURPLUS period accrues[1] (Movements C and E); from the commencement of the con-

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1. Insofar as the rate of capital deficit is a function of the rate at which interest is charged to the amounts outstanding -- the rate of change is a function of the interest rate -- then Questions (1) and (2) are interactive.

tract (Movement G) but only until the start of the CAPITAL SURPLUS period; at some other time? The most likely answer to this series of alternatives is that "reinvestment takes place when it is profitable to do so, and is of such funds as are available at that time": which effectively implies that it can be at any time in the life of the individual contract. Recourse must be had to a convention. Here it shall be assumed that reinvestment takes place when the contract moves into CAPITAL SURPLUS (as per E.L.A. submission).

(b) At what time in the year does reinvestment take place?

This is not the trivial question it may appear, because until reinvestment <u>does</u> take place, interest (under the Investment Period approach) must be deemed to be accruing to the "donating" contract[1]. At high rates of interest, the impact on a contract can be significant not only in terms of amount, but equally importantly in terms of inducing the commencement of the CAPITAL SURPLUS period itself.

Here the adopted convention is that reinvestment takes place on receipt of the inflow.

2. <u>What rate of interest should be used</u>

This is the same problem as was discussed in the "single venture" system.

(a) Cost of funds or investment opportunity rate? Potentially there is a conflict here; but, given that the purpose of reinvest-

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1. That is, the contract <u>from</u> which reinvestment takes place.

ment is the profitable use of funds, then the interest rate ought to reflect that profitability -- a reinvestment opportunity yield should be used. Alternatively, the reinvestment of internally generated funds permits the lessor to grow without recourse to raising new funds[1]: therefore, the interest rate should be the cost of new funds foregone.

Are the two rates -- the reinvestment opportunity yield and the cost of new funds -- necessarily incompatible? Surely not: reinvestment in further leasing operations will be promoted until the yield on new business (assuming, diminishing, marginal productivity) comes into equality with the cost of new funds. Beyond this point it would be more profitable to use internally generated funds to retire existing debt[2] than to promote any new leasing business. (It may be noted that this stage will be reached when the premium from the yield in marginal leasing business over the opportunity gain of cutting back loan capital costs is just sufficient to compensate for the higher risks and operating costs involved in those leasing operations.) Thus, the cost of funds establishes the "floor rate" of interest in the computation.

(b) However, the <u>actual</u> yield on reinvestment recorded in the books of account will not be the yield on marginal reinvestment, but the average yield on all reinvestment.

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1. Subject to (i) a "loss" of internally generated funds in taxation and dividends and (ii) a growth rate faster than that which can be sustained entirely by internally generated funds.
2. It is assumed that the cost of existing and new loan funds are similar. Should there be a significant difference then the analysis becomes more complex but does not differ in principle.

Thus, the ASSC, if in agreement with the arguments discussed here, should not recommend a reinvestment rate based on cost of funds but one based upon the average earning opportunity rate available to the lessor. The question becomes, therefore, how does the lessor determine his unique rate? In practice this is not such an easy question to answer (as the yield will certainly vary from year to year as economic factors within the market change) but a standard convention could be recommended along the line of average yield on the current, and recent past, leasing agreements.

2.10 A PORTFOLIO OF LEASES

The discussion will now concentrate on one of the proposed arguments against the Investment Period method, viz: the multiple counting of profit on the positive cash balances during what has been termed the CAPITAL SURPLUS period. The argument rests on the reinvestment of project cash-flows into alternative leases[1] -- the actual route of the cash-flows may be extremely circuitous and disguised (via several sequential bank accounts for example). But given that the yield on new lease contracts is higher then external investment then it is argued that it is economically logical for the lessor to pursue this financing policy.

It will prove useful to forewarn the reader at this stage that any reconciliation of individual accounts (when ultimately consolidated to form the lessor's or the parent's Statutory Accounts) under the Investment Period system will be a complicated, if not monumental,

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1. Via any of the alternative movements D, E, F or G.

task. (Of course, this may only be a hypothetical consolidation depending upon how the lessor actually records his transactions -- i.e. Single Venture accounting records or total company records. But if profit, interest and depreciation are based upon the Single Venture method, even if the actual figures are combined for the purposes of the lessor's ledger accounts, the lessor must be able to show to the auditors satisfaction that such implicit Single Venture accounts records do 'bolt together' to give the whole.) In view of this, the accountant of the organisation may be subject to a high probability of error when aggregating the various transactions from numerous independent accounts records. Thus, it is possible to distinguish between a problem of "multiple recording" of interest/profit and the "special double counting" of interest/profit. The former is possible through human error, the latter may arise from an inherent error in the accounting system, given that reinvestment takes place. It should be noted, however, that in discussions with members of the E.L.A. their representatives have indicated that the "Single Venture" system is a true reflection of lessor business practice. Thus, when the lease contract in Table 2.5 is set-up the lessor would initiate an independent bank account which was in deficit (probably to the parent) by, in this case £2000. As the rentals and Capital Allowances are received a second bank account would be established which remains in credit[1]. When considered together the two accounts would receive interest gains and

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1. At some stage in the lease's life the two accounts will be in balance and from that point on a surplus revenue will be generated. It may be said, therefore, that at this point the initial debt has been extinguished; whether, in fact, it has or has not in terms of amalgamating the two accounts.

interest charges which, when aggregated, would equal the "interest" line 10 on Table 2.5. However, in the reinvestment system this assertion is challenged; in particular an examination is made of reconciliation of interest charges and credits between the various independent accounting records when consolidating.

Table 2.5 will now be reconsidered, and henceforth referred to as Lease No. 1. It is observed that the initial capital cost of the Lease is recovered in period 19x3, becoming positive on receipt of the first year allowance. The surplus is shown as £218 in line No. 9. As this money is now freely available to the lessor it may be assumed that he reinvests it through the medium of a second lease (termed Lease No. 2). In common with its donating contract, it shall be assumed that the lessor sets his rentals so as to receive a 20% return; which implies that the £218 of capital is recovered by 5 annual rentals of £61 -- i.e. the yield on this lease is, as Lease No. 1, 20%. In the tables that follow the reinvestment of contract cash-flows is based upon the following two conventions (which concur with those used in the E.L.A. submission):

(i) That reinvestment will occur for the first time at the commencement of the CAPITAL SURPLUS period, and

(ii) That reinvestment is simultaneous with receipt of inflows.

The same taxation and other conventions as were used for Table 2.5 will be adopted here. The relevant data will now be produced for Lease No. 2 using the Investment Period method:

TABLE 2.9

LEASE No. 2 — THE INVESTMENT PERIOD — "PORTFOLIO" PROBLEM (£)

ACCOUNTING YEAR END (31 DEC.)			19x3	19x4	19x5	19x6	19x7	19x8	19x9	19x10
No.	NAME	DATE								
1.	Amount outstanding	Jan. 1	(218)	(173)	(123)	27.5	68.5	108.5	83	53
2.	Rentals received	Jan. 1	61	61	61	61	61	—	—	—
3.	Pre-tax outstanding investment	Jan. 1	(157)	(112)	(62)	88.5	129.5	108.5	83	53
4.	Tax charge on rent received	Jan. 1	—	—	(30)	(30)	(30)	(30)	(30)	—
5.		Jan. 1	(157)	(112)	(92)	58.5	99.5	78.5	53	53
6.	Tax relief (charge) on interest on o/s investment as per item no. 10	Jan. 1	—	—	8	5	(1)	(3)	(5)	(4)
7.		Jan. 1	(157)	(112)	(84)	63.5	98.5	75.5	48	49
8.	First year allowance	Jan. 1	—	—	109	—	—	—	—	—
9.	Net-of-tax outstanding investment	Jan. 1	(157)	(112)	25	63.5	98.5	75.5	48	49
10.	Interest thereon at 10 percent	Dec. 31	(16)	(11)	2.5	6	10	7.5	5	5
11.	Amount outstanding	Dec. 31	(173)	(123)	27.5	68.5	108.5	83	53	54

TABLE 2.10

LEASE No. 2 -- PROFIT AND LOSS ACCOUNT

ACCOUNTING YEAR-END DEC. 31st.	PRIMARY RENTALS RECEIVED	DEPRECIATION CHARGED	GROSS EARNINGS	INTEREST CHARGED/ CREDITED	PROFIT/(LOSS) PRIOR TO CORPORATION TAX
19x3	61	10	51	(16)	35
19x4	61	25	36	(11)	25
19x5	61	61	0	2.5	2.5
19x6	61	61	0	6	6
19x7	61	61	0	10	10
	£305	£218	£ 87	(£8.5)	£78.5
19x8				7.5	7.5
19x9				5	5
19x10				5	5
etc.				etc.	etc.

The effect of this decision on Lease No. 1, Table 2.5, is quite dramatic: a new line is now required in this table entitled "Reinvestment of Surplus Cash Flow" -- Line 9A. This would have an entry of (£218) giving a zero balance as follows:

PART OF TABLE 2.5 REPEATED

TIME:	19x3 (ORIGINAL)	19x3 (AMMENDED)	
LINE NO: 7	(782)		(782)
8	1000		1000
9	218		218
		9A	(218) to lease No. 2
10	22		0
11	210		0

The result of this on the Profit & Loss account for Lease No. 1, Table 2.8, would be to produce a zero entry in the year 19x3 of the column entitled "Interest Charged/Credited" which currently has a figure of £22 in it. Thus, returning to Table 2.5, the column for the year 19x4 now begins, not with an Amount Outstanding of £240 surplus, but with zero. The rental received of £557 can be entered, and the tax of (£278) deducted from the second year rental. Note that because of the time delay convention on taxation, tax relief of £51 will still be received in 19x4, but because no interest is attributed to the £218 surplus it will not attract a tax charge of (£11) in 19x5. The year 19x4 would then end with a surplus in column 9 of £330 (=0 + 557 - 278 + 51) which would once again be reinvested in, shall we say, Lease No. 3.

It follows from this that NO interest figure would appear in year 19x4 of Lease No. 1's Profit and Loss account.

If this argument is continued it will be observed that:

I. No interest would be credited to Lease No. 1 during its CAPITAL SURPLUS period, and

II. A series of new lease contracts[1] would be started at the beginning of each period which would have a capital cost equal to the balance outstanding, using the adjusted calculations shown above: Lease No. 2 = £218; Lease No. 3 = £330 etc.

Thus, if the lessor had, in fact, used the SURPLUS CASH FLOW to undertake a second lease, and then proceeded to aggregate the two (or more) leases together using the Investment Period method, then the following consolidated set of data would arise:

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1. This argument can be complicated considerably as will be seen shortly.

TABLE 2.11

COMBINED PORTFOLIO OF LEASES NO. 1 AND NO. 2

ACCOUNTING YEAR-END DEC. 31st.	PRIMARY RENTALS RECEIVED	DEPRECIATION CHARGED	GROSS EARNINGS	INTEREST CHARGED/ CREDITED	PROFIT/(LOSS) PRIOR TO CORPORATION TAX
19x1	557	101	456	(144)	312
19x2	557	228	329	(103)	226
19x3 L1	557	557	0	22	22
L2	61 } 618	10 } 567	51 } 51	(16) } 6	35 } 57
19x4 L1	557	557	0	57	57
L2	61 } 618	25 } 582	36 } 36	(11) } 46	25 } 82
19x5 L1	557	557	0	89	89
L2	61 } 618	61 } 618	0 } 0	2.5 } 91.5	2.5 } 91.5
19x6 L1	0	0	0	68	68
L2	61 } 61	61 } 61	0 } 0	6 } 74	6 } 74
etc.					

If the Portfolio Profit and Loss account shown above is a valid statement of the Lessor's activities and transactions then it should be possible for the company's auditors to reconcile the interest credited to Lease No. 1 during its CAPITAL SURPLUS period with that charged to Lease No. 2 for its use of those funds during its CAPITAL DEFICIT period[1]. (The point has previously been made that interest credited to Lease No. 1 in its CAPITAL SURPLUS period will not, in fact, exist if there is internal reinvestment from this point on in the lease's contract). It would follow from this that, for the Investment Period

1. On the specific understanding that the two rates are the same: in this case 10%.

method to be accurate, the "interest charged/credited" column should sum to zero in the periods where funds are flowing from one lease to another[1]. What then, causes the discrepancy in this column in Table 2.11: namely, 6, 46, 91.5, 74 etc.?

If period 19x3 is considered the inconsistency amounts to £6: this is a result of reducing the amount outstanding in Table 1.9 (19x3) by the rental received of £61 -- (there is a slight difference of 0.1 due to rounding, thus 6 = 61 x 10%).

The lessor, under the Investment Period system, claims an "income" of £22 (being a "receipt of interest") on Lease No. 1; and admits a "charge" of £16 (being a "payment" of interest) on Lease No. 2. However, the "charge" of the £16 arises from the investment of the same fund (£218) that was generated by the CAPITAL SURPLUS period of the donating lease -- that is, Lease No. 1 "donates" capital to Lease No. 2. Can we meaningfully ascribe the two sets of interest data to the same capital?

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1. The reader may conjecture that the discrepancy is in fact caused by the use of the two different interest rates -- the yield on the contract being 20%, and the reinvestment rate 10% -- if these two figures were the same, at 20%, would the interest column then sum to zero in each year? The answer is NO.
If we take Lease No. I and apply a 20% interest rate to it (at line 10) we would obtain the following:

TIME:	X3	X4	X5	X6	X7	X8
LEASE No. 1, INTEREST	3	83	155	121	57	78

This lease would than go into CAPITAL SURPLUS in X3, giving a potential capital input into Lease No. 2 of £14. However, this makes no significant impact on the interest figures because of its relative size so we shall ignore it and concentrate instead on Lease No. 3, commencing in X4. This has a capital input of £396, which if imputed into a 20% yield lease would give a repayment schedule of £110/annum for 5 years. Calculating the interest on this schedule gives:

TIME	X4	X5	X6	X7	X8
LEASE No. 3, INTEREST	(57)	(46)	0	16	30

The disparity between the two schedules is again very apparent.

It might be argued that the two interest figures are really an internal transfer price for the use of funds and that they will "net out" on aggregation. The immediately preceeding Table 2.11 shows that in fact they do not because of the 'intrusion' of the first rental in respect of the reinvested (receiving) lease. But, of course, that receipt will (should) be at once reinvested in lease No. 2A -- the interest charge on which, in its first year of operation, should just offset the interest imputed to the first year's rental receipt on Lease No. 2.

If the previous paragraph is found to be rather complex, then the difficulty will be appreciated of trying to follow the intricate paths of rentals and interest -- some real, some ficticious -- in the following years 19x4, 19x5, etc.

It will be further appreciated that as time passes the whole problem cascades into an extreemly complex hierarchy of lease contracts whose parentage was Lease No. 1 .

This compounding effect will ultimately have lease rentals entering the leasing organisation (net of interest charges, taxation and capital allowances) which will be pledged to further leases. The whole system will be subject to timing lags and gains (particularly taxation) which will be extreemly difficult, if not impossible, to reconcile with the interest/profit figure granted to Lease No. 1 in the CAPITAL SURPLUS period.

Thus, if lease contracts are evaluated using the Investment Period method and the aggregated together into a combined portfolio Profit and Loss account then (on the assumption that there is reinvestment

and that the sums generated by one lease are used to finance another) then there is a very real danger of "multiple recording" of interest data which could become a "multiple counting" of interest receipts. This arises because Lease No. 1's surplus cash-flow is ascribed a series of earnings which are generated by Lease No. 2, and so on and so forth through a gamut of leases, each of which would be allowed to display an independent profit. It would thus become an impossible task to reconcile the interest gains and charges from each lease back to the Nominal Ledger because the relevant figures are submerged in a labyrinth of lease contracts.

It might be argued that no aggregation into a Portfolio Profit and Loss account is intended. This would seem to imply that the Investment Period system of accounting for leases is <u>not</u> a public reporting system, and that it is essentially a management accounting system whereby management can see the "profitability" of each lease -- as it were, "pas seule". Transfer prices are a familiar aspect of profit centre responsibility accounting and in essence that is what we would have here[1].

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1. One observation may be made however. Most authorities, see SOLOMONS [125, Ch. 6], TOMKINS [131] and HOPWOOD [77] record the very considerable difficulty of measurement and behavioural responses associated with transfer prices and their frequently near disastrous effect upon profit centre responsibility accounting. The discussion on this issue will be left with the following observation: senior management is in the habit of wanting management accounts to demonstrably reconcile, preferably through aggregation, with the period-end Profit and Loss account --- a habit which may have some unfortunate outcomes in the case under consideration.

Implications for the Reporting of Lessor's Profits

1. If lessors adopt the Investment Period method of accounting in its current form (and by the same taken the lessor's auditors do not object to its use) then the interest gain which is attributed to each lease's cash-flow generated in the CAPITAL SURPLUS period will, apropos the "Single Venture" method of calculation, become profit. If such Single Venture projects are consolidated in the lessor's parent bank's accounts then errors in profitability may ensue. As was demonstrated in the argument on lease portfolios and the "reinvestment assumption", if cash-flows are to be reinvested within the company then

   (i) they will contribute towards the initial capital input for a series of further leases into the future; and

   (ii) it will automatically follow that a fictitious profit will be recorded on the second and subsequent leases ..... which has previously been allocated to (subsumed within) the profit schedule of the initial lease during its CAPITAL SURPLUS period.

   If this procedure is continued over a number of years and a number of lease contracts then the proposed accounting data of Tables 2.5 and 2.9 will create a totally illusory effect on the group's profit statement because the profit will be exaggerated by each new lease. In short a "double counting of profits" will be observed.

2. As will be seen later in the Thesis (Chapter 7) most U.K. lessors do employ a mix of different sorts of capital -- some long, medium and short-term debt together with an equity stake. However, economic circumstances today make it common practice to

raise a tranche of capital for a specific leasing venture. This debt, and its associated interest costs, are then transferred to the lessee through a specially designed lease repayment schedule which mirrors that cost. At first sight, therefore, it would appear to be a logical extension of marginal cost pricing to allocate interest burdens to specific contracts in accordance with the prevailing money costs when the deal was signed and the monies (supposedly) raised to back the project. But, it has been argued that funds circulate within the leasing company and as such any previously raised money, in whatever form, will still be present in the organisation; albeit impossible to identify or isolate. Thus, for example, the lessor's equity base remains within the leasing organisation as an integral part of the overall pool of funds through which the lease contracts are funded[1]. Hence, the use of a specific debt instrument, with its implicit interest rate, as a basis for determining the profitability of an individual lease fails to reflect (what is believed to be) the true "nature and financing" of the leasing organisation. The funds used to support a lease are actually (if indirectly) financed by a combination of past and present financial instruments which have an 'economic cost' equal to their reinvestment opportunity rate.

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1. A second line of argument which is applicable here (the issue has been raised before in footnote 1, page 92; it will be considered again in more depth in a later Chapter) is the problem of allocating the cost of specific form of finance to a specific project or lease contract; what will be termed "discriminatory financing". The cost of one form of finance cannot be considered in isolation because its costs are heavily dependent upon the type and size of other sources of finance used by the lessor.

2.11 A MODIFICATION TO THE INVESTMENT PERIOD METHOD

In Table 2.12 some, but by no means all, of the problems inherent in the Investment Period system have been removed. This illustration utilises a 15% interest rate -- 10% cost of funds, plus a 5% premium to cover risk and operating costs -- which presupposes that further leasing business will yield at last that return[1]. A reinvestment back into the contract in the later years of its life is also necessary to finance the "tail" of tax liabilities arising out of the later rentals. Provision could be made for this if a sinking fund was established in the years of capital surplus x3, x4 and x5 (a sum of approximately £120 would suffice per annum) thereby equalising the tax costs. It would then follow that reinvestment in the contract's CAPITAL SURPLUS period would be that much less.

The problem of late tax liabilities apart, in Table 2.12, no interest accrues to, or is charged against, the contract from the commencement of the CAPITAL SURPLUS period. As was argued, to impute any "earnings" to the contract during this period is double counting[2].

If this difficulty is assumed away, as it were, we might say that the reinvestment disbursement from "our" contract ought to result in a credit to "our" contract in its CAPITAL SURPLUS periods which would exactly equal the charge for interest imputed to the recipient contracts in their CAPITAL DEFICIT periods.

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1. Just what is meant by "yield at least 15%" remains uncertain --- is it the true yield or the discount rate implicit in either Tables 2.5 or 2.12? See "major differences No. (1) and (2)" in the text immediately following Table 2.5, page 80, supra.
2. The earning potential of the cash surplus is reflected in the rentals of subsequent lease agreements.

TABLE 2.12

A MODIFICATION TO THE INVESTMENT PERIOD METHOD

ACCOUNTING YEAR END (31 DEC.)		19x1	19x2	19x3	19x4	19x5	19x6	19x7
No. NAME	DATE							
1. Amount outstanding	Jan. 1	(2000)	(1659)	(1267)	0	0	0	0
2. Rental received	Jan. 1	557	557	557	557	557	0	0
3. Pre-tax outstanding investment	Jan. 1	(1443)	(1102)	(710)	557	557	0	0
4. Tax charge on rent received	Jan. 1	–	–	(278)	(278)	(278)	(278)	(278)
5.		(1443)	(1102)	(988)	279	279	(278)	(278)
6. Tax relief (charge) on interest on o/s investment as per line 10	Jan. 1	–	–	108	83	0	0	0
7.	Jan. 1	(1443)	(1102)	(880)	362	279	(278)	(278)
8. First year allowance	Jan. 1	–	–	1000	–	–	–	–
9. Net of tax outstanding investment	Jan. 1	(1443)	(1102)	120	362	279	(278)	(278)
9A. Amount reinvested in further leases	Jan. 1	–	–	(120)	(362)	(279)	278	278
9B. Outstanding investment in this lease	Jan. 1	(1443)	(1102)	0	0	0	0	0
10. Interest thereon at 15 percent	Dec. 31	(216)	(165)	0	0	0	0	0
11. Amount outstanding in this lease	Dec. 31	(1659)	(1267)	0	0	0	0	0

Under a reinvestment system of cash-flows there can be no recording of interest charges or credits to the individual contract. Insofar as Table 2.8 is an integral part of the Investment Period approach to accounting for equipment leases; as the column in that Table entitled "Interest (charged)/credited" does not exist, then the Investment Period approach cannot be sustained as an accounting procedure.

2.12 CONCLUSION

The Investment Period approach (so far as concerns the integral computation of interest cash-flow) appears to be supportable only if leasing organisations do, in fact, manage the financing of their contracts on a "Single Venture" basis. This may or may not correspond to the facts of lease operations -- it is argued here that it does not. Nonetheless:

1. There is implicit in the method a vague and arbitary determination of the period over which the contract should be valued: for there is implicit in the "Single Venture" basis a residue of contract cash-flows which can presumably earn interest to infinity. This carries implications for the size of external deposits to be presumably seen in the lessor's accounts.
2. There is no clear indication as to what rate of interest should be used when the cash-flows are reinvested. It has been argued here that the Investment Opportunity rate is the most appropriate, however, the E.L.A. suggest the market cost of funds.
3. The issue of depreciation, and how it is derived, is potentially a very dangerous policy for the lessor to pursue.

Distributable contract cash-flows are to be reported under this system when the lessor is most heavily committed to repaying the initial capital sum. This is not only unwise, but it contradicts the axiom that profits from an operation should be proportional to the capital invested. This latter argument applies with equal force to the proposal that depreciation should be expressed as a residual between rentals and gross income rather than a cost of

operating.

4. It is proposed here that any method of accounting for leases in the books of the lessor should be based on the actuarial or pure discounting process shown in Table 2.8. This recommendation is based on the sound underlying economic rationale of this system.

CHAPTER 3

THE BUSINESS ENVIRONMENT IN WHICH LEASING DECISIONS ARE TAKEN

3.1. INTRODUCTION

It is the intention of this Chapter to consider what economic circumstances influence and motivate management when they are formulating a particular financing decision or capital budgeting strategy. It is argued that in doing so we will define the framework within which to discuss the results of the Industrial Survey and theoretical arguments that follow in later Chapters. Hopefully, one outcome of this discussion will be a clear view of the financial environment faced[1] by management and the economic climate within which industry takes investment and financing decisions.

It is stressed at this point that the reasons and extent of the failure of the U.K. economy to attain those levels of growth in Gross National Product which would simultaneously secure the stability of Sterling, the reduction of inflation, higher levels of employment and improved standards of living have been well catalogued elsewhere in the verbal and written comments of politicians, trade unionists, academics, public servants, private industrialists etc., and as such they will not be rehearsed here. It is taken as axiomatic -- "the wide consensus of the opinions of acknowledged authorities" -- that the U.K. economy is experiencing difficulties.

One phenomenon that has received widespread attention, has been the comparatively low level of industrial spending on new and replacement production equipment which has characterised the period. As will be discussed below, opinions differ as to whether this has been a cause of our lack of national economic progress; or a result, in that management confidence in the level of future economic activity and profitability is fundamental to the decision to incur capital expen-

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1. That is, faced at the period of the Industrial Survey (Chapter 7): 1974-75.

diture; or an inevitable by-product of an "excessive diversion" of economic resources to the non-market sector.

3.2. FIXED CAPITAL FORMATION IN THE UNITED KINGDOM

I THE BACON AND ELTIS ARGUMENT

BACON & ELTIS argue[1] that during the last decade, and possibly longer, there has occured a significant structural change in the economic posture of the United Kingdom. Their argument, which is produced below, is based on a series of events and Government actions which they believe have contributed to our general economic deterioration and present deficiency of industrial investment.

In an effort to mitigate the effects of unemployment in the various economic downturns that have occured in the past 15 years, successive Governments have intervened in the economy. Their modus operandi has been based upon an attempt to "turn-around" any prevailing recession by encouraging state-backed projects and by redirecting a significant proportion of the surplus labour made available into the public sector.

To substantiate this assertion BACON & ELTIS state that during 1970-1973, for example, approximately half a million new workers became engaged in the Health Service, the Education Service and Public Administration in general. They consider this trend to be disconcerting and in marked contrast to the economic posture of some of our industrial competitors: if we take the period 1955-1973 manufacturing employment in the U.K. actually fell by 13%;

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1. This was originally propounded in a series of articles in the Sunday Times (see 2nd, 9th, 16th, 23rd and 30th Nov. 1975) and subsequently published as [9] . All statistics quoted in this section of the Thesis are derived from this source.

whereas it rose by 11% in France, 31% in Germany, 57% in Italy and by 155% in Japan. BACON & ELTIS consider that this change in the employment profile of the U.K. labour force has had far reaching consequences for the industrial sector.

In formulating their strategy of economic management the Government is considered to have chosen this line of action because, in the first instance at least, such a transference of labour could be accomplished without the need for a substantial infusion of capital. It was recognised that this would not be the case if this extensive workforce were to be redeployed, or recycled, back into productive employment: to enact this policy would require a large infusion of funds into the private sector, which since the mid 1960's has experienced falling levels of profit[1] and an abatement in industrial spending[2].

A further motive influencing the Government to induce this change in the labour force was that, in the post 1974 years, the public sector was, by comparison, a low wage-rate employer. As such any strategy of this nature could reasonably be considered to be a relatively inexpensive expedient.

However, since the initiation of this philosophy the situation has changed: for the burden of public expenditure has risen with daunting

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1. Profits in the manufacturing sector were 17% of manufacturing output in 1964; falling to 7% in 1970, 71 and 72; and a mere 3% in 1973.
2. The ratio of Industrial Investment to Industrial Production was 7½% to 8% in the mid 1960's, falling to 2.8% in 1972, 3.6% in 1973. and 5.3% in 1974. The latter years are worsened considerably when the influence of heavy investment in the North Sea is removed from the figures.

speed, largely, it is argued, due to the favourable money wage rises negotiated in this sector during the last three years. To add to this burden, it has also been a concurrent policy of Government to support various industrial projects on a vast scale (Concorde, Rolls-Royce, British Leyland etc.). Such ventures have not only consumed a great deal of resources -- depriving the remaining industrial sector -- but, so far at least, they have fallen far short of producing revenues greater than their costs. Furthermore, due to a combination of high technology, poor estimations of expenditure and weak financial control they have overspent budgets many times..

This shift of resources into the publicly owned sector has, according to the BACON & ELTIS argument, largely been irreversible in the periods when it was least required. They argue that the drain of labour out of the manufacturing sector would have been acceptable if it was only a temporary measure; but this has not been the case.

For in the periods when the economy has begun to experience favourable conditions, the "boom" has always failed to be consolidated because there has not been an adequate supply of labour to support it.

Having experienced this phenomenon, management has actively pursued labour saving machinery which tended to exacerbate the unemployment problem in 'slack' periods, so that still more of the workforce was drawn into the public sector.

Because manufacturing industry has a contracting workforce, those that remain in productive employment have been expected to support a growing unproductive element in the economy. It is argued by BACON & ELTIS that the only way in which the Exchequer can sustain this position is to borrow heavily abroad and to increase the taxes on indivi-

duals and the Corporate Sector. Thus, the companies, observing the rising level of taxation and the increasing difficulty of earning a "reasonable" return on capital (coupled with world-wide problems of inflation, increasing commodity prices and interest rates: see section 3.3), contracted their activities by unburdening themselves of still more labour and so the downward spiral is set in motion. It is further postulated that the rising toll of taxation on the wages of industrial employees has had the psychological effect of reducing the desire to increase their productive efforts, which on an after-tax basis do not appear to be adequatly rewarded. In fact, the rise in productivity that has been seen in the U.K. (a growth in output per man between 1961-1974 of 4% per annum[1]) has always been off-set by a notable reduction in the number of hours worked.

In summary, therefore, the failure of the U.K. to invest adequately in industrial plant and machinery is a by-product of excessive pressures being placed on the corporate sector by the very substantial transfer of labour into the non-market sector. The current economic posture (which has witnessed an increase in non-market expenditure from 44% of the pre-tax marketed output of the economy in 1962, to approximately 61% of this value in 1974/1975) simply cannot be supported by manufacturing industry. Faced with a massive diversion of industrial production into Government financed activities, the corporate sector has reacted to the constraints placed upon it by contracting its fixed capital expenditure programmes.

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1. Which, in comparison to West Germany, France and Italy, who all achieved rates of 5.5% per annum, is poor.

Several leading UK economists have responded to the BACON & ELTIS thesis (see Sunday Times of footnote 1, page 115) and their contribution to this debate is synthesized below. In section 3.3 of this Chapter we will move away from the "macro-economic view of our structural problems" and consider the rôle of managerial confidence and corporate liquidity both of which have clearly been contributory causes to the decline of capital investment in the U.K..

II CONFLICTING STATISTICS AND OPINIONS

Many of those who disagree with BACON & ELTIS imply that the statistics they chose to elucidate their argument are not relevant, or are given undue emphasis. For example, one writer notes that while the increase in the level of public sector employment between 1961 and 1974 was indeed of the order of 45%, BACON & ELTIS had overlooked the 'fact' that 73% of the extra workers were women, many of whom were employed on a part-time basis. Hence, they could not have seriously deprived industry of manpower!

However, the crux of the debate centres upon the conflicting statistical evidence which can be used to indicate that, either UK management is not significantly different in its investment policies than other countries, or that poor management/worker relations and simple bad management lie at the root cause of our industrial-economic problems.

It is frequently said that the U.K. does not invest sufficient capital into industry, and indeed this is borne out when the levels of manufacturing investment per employee is considered: in 1971 the figures for the U.K. were 56% below those in West Germany and 148% below those in France. If growth in investment is fundamental to growth in GNP then this woul

seem to indicate that it is the failure of the U.K. to invest which has caused us to fall behind our international rivals. However, if another survey is taken, which sought to establish if the U.K. was loosing its international competitiveness because it had failed to invest adequatly in new plant (and by implication it was currently operating on a legacy of productive assets that were growing steadily older and presumably less efficient), it is shown that the service life and average life of U.K. and U.S.A. machine tools in 1971 was almost exactly the same. Thus, the U.K. workforce was running on machinery which had a comparable average age with one of the most advanced economies in the world.

Yet further conflict can be seen when we move away from the figure of manufacturing investment per employee to a ratio which shows U.K. management's capital spending policy in a favourable light: namely, investment as a percentage of manufacturing output. Taking the period 1953-1971 the U.K. invested 13.1% of its manufacturing output. This can be compared with a figure of 13.9% for France over the same period, and only 11.9% for Germany. From this, management representatives conclude that their current investment activities compare extremely favourably with our European competitors. Given a reduction in the heavy taxation on profits and dividends (which they argue has suppressed the level of funds available for investment) then the current U.K. investment targets would rise and comfortably exceed those of its EEC rivals.

This argument is countered by those who place bad management decisions at the forefront of the list of problems. Such economists favour looking at the 'quality' of investment, rather than sheer quantity (citing that investment, per se, is not the answer: vide, the aircraft indus-

stry and electric power generation). Thus, using the period 1953-1971 it is observed that Italy and France produced 50% more output per £ of capital employed than the U.K., and Germany managed to secure 170% more output than this country.

And finally to add yet further credence to the poor management theory, a study of machine and labour usage in the Midlands indicated that in a full working day, 50% of the available machine time was unused. This was attributed to a combination of poor scheduling, poor plant layout and excessive handling of materials, bad management and unnecessarily long periods of employee absenteeism from the place of production.

III INTERIM CONCLUSION

From the wealth of contesting statistical evidence that has been presented, it is considered to be outside the scope of this Thesis to draw firm conclusions. Cause and effect are frequently so entangled that meaningful judgement or deduction on this highly complex macro-economic debate cannot be accomplished in so short a space. However, it does seem to be a relatively safe deduction that the attained level of industrial investment in fixed assets is at least one major contributory factor to the present unsatisfactory state of the U.K. economy.

Therefore, the next section will discuss two very important industrial problems that can be more satisfactorily explored within the framework of this study. Section 3.4. will consider a procedure which can be of significant help in alleviating these difficulties; with leasing playing a major rôle in stimulating fixed capital investment.

3.3 MANAGERIAL CONFIDENCE AND CORPORATE LIQUIDITY

During the period covered by this research study the corporate sector was experiencing a series of fluctuations in its liquidity position (vide Table No. 3.1, overleaf)[1]. At the time of the Industrial Survey, the first two quarters of 1974, the oscillation was entering a severe trough during which Industry had great difficulties acquiring externally generated finance. The following quote reflects managerial consternation during this period:

> "The decline of U.K. stock market values has discouraged new equity issues; and high nominal yields have made debenture issues look too expensive. With large uncertainties concerning the prospects for profits and the future rate of inflation, companies have been unable to judge whether they could achieve a real return on new investment adequate to justify raising new funds in either form. Gearing constraints, too, are becoming more prevalent; and both banks and companies are now anxious to conserve for increasing working capital such further room as they may still have for further growth in bank finance".

BANK OF ENGLAND QUARTERLY REVIEW DEC. 1974, p.395.

A year later the Bank was to report that 1975 saw the largest amount of equity funds raised on the London Stock Exchange for several years -

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1. Table 3.1 source: "Department of Industry Survey of Company Liquidity" first undertaken on 10th Dec. 1974, see ECONOMIC TRENDS of that date. The survey covers approximately 215 of the largest U.K. companies. Data is taken quarterly and published in TRADE AND INDUSTRY. The figures represent the outstanding amounts at the end of each reporting period.

TABLE 3.1

U.K. CORPORATE LIQUIDITY
HOLDING OF CURRENT ASSETS AND CURRENT LIABILITIES

YEAR	1969	1970	1971	1972	1973 per quarter				1974 per quarter				1975
					1 st	2nd	3rd	4th	1st	2nd	3rd	4th	1st
Total current assets	997	862	1041	1582	1806	1837	2206	2277	2101	2187	2069	1988	
Total current liabilities	1664	1511	1602	1927	2139	2183	2486	2771	2747	3292	3874	4229	
Net current assets (T.C.A. - T.C.L.) ---- all figures negative	-667	-649	-561	-345	-333	-346	-280	-495	-1191	-1688	-2160	-2462	
Liquidity Ratio $\frac{\text{T.C.A.}}{\text{T.C.L.}} \times 100$	60%	42%	84%	82%	84%	84%	89%	82%	64%	56%	49%	45%	

- a total in excess of £12,000 Million.

It is to be noted, however, that while this sum is undoubtedly large, the ability to raise new equity was not widespread across all industry[1].

The funding of U.K. industry over the previous ten years is put in perspective by the National Economic Development Office's report "Financial Performance and Inflation" (6 FEB 1976)[2], which notes that the decline of industrial investment has been mirrored by a sharp downward trend in Return on Assets and a negative rate of Net Real Retentions.

RETURN ON ASSETS (i)			NET REAL RETENTIONS (ii)		
MANUFACTURING INDUSTRIES			MANUFACTURING INDUSTRIES		
1965	1970	1973	1965	1970	1973
10.2%	7.0%	6.0%	15.3%	-10.3%	-18.8%

(i) Return on Assets is calculated by NEDO as Profit less Stock Appreciation divided by the value of fixed assets on a replacement. cost basis.

(ii) Net Real Retentions are defined by NEDO as the percentage of Gross Trading Income after allowing for Stock Appreciation and providing for replacement cost depreciation.

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1. Almost all the new equity raised was in the form of rights issues induced by a rapid recovery of the market in the first quarter of the year. A substantial part of this volume was taken up by the extra-ordinarily large British Leyland issue together with a concentration of issues from firms in the food and chemical industries.
2. The report is based upon an examination of over 12,000 quoted public companies covering more than 60% of the total net asset value for all industrial and commercial companies in the U.K..

The collapse of fixed capital formation in the U.K. is considered to be a product of insufficient internally generated finance to support on-going activities (a subject which shall be returned to in section 3.4.).

NEDO remark:

> "The inability to sustain the flow of adequate internally generated funds could have meant that many companies were reluctant to move into new investment areas, since the outside funds which would have been required had already been pre-empted to maintain current operations".

This can be demonstrated in Table 3.2, where the Sources and Uses of Capital Funds[1] by U.K. industry shows the inexorable rise in the proportion of finance needed to support Stock Appreciation and the increasing drain of interest repayments[2]. The levels of debt now attained by many companies is also exceedingly high, as shown in line 2 of this Table.

Thus, while these statistics do not explain the current economic position they are clear indicators of the strains that management is subjected to. It is a truism of industrial life that confidence in the future is the key element in motivating investment; and with the propect of producing a positive, worthwhile, return on capital being very slender, the overwhelming financing problem in the short run

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1. Table 3.2 was compiled from the H.M.S.O. monthly publication FINANCIAL STATISTICS (further information of a broadly similar nature may be gleaned from the reviews published by the BANK OF ENGLAND and BARCLAYS BANK). The Statistics are found in Table 82:"Sources and Uses of Capital Funds for Industrial and Commercial Companies".
2. From NEDO's data (compiled so as to take into account inflation) the rise in Stock Appreciation was from 4.5% in 1965 to 32.3% in 1973. Interest payments rose from 7.7% of Gross Income on 1965 to 13.6% in 1973. The figures shown in Table 3.2 show a somewhat higher trend.

TABLE 3.2

SOURCES AND USES OF CAPITAL FUNDS BY INDUSTRIAL AND COMMERCIAL COMPANIES

(£ million)

SOURCES OF FUNDS	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
1. Total income (Generated in U.K. & overseas)	6930	6624	6824	7872	8742	8758	9561	11291	15142	
2. Bank borrowing	473	222	273	535	664	1126	732	2988	4504	
3. Equity issues	63	123	65	299	177	39	152	317	98	
4. Other sources, including Debentures and Preference Shares	583	615	382	255	546	534	465	266	1152	
5. Total	8049	7684	7544	8941	10129	10457	10910	14862	20896	
USES OF FUNDS										
6. Gross domestic fixed capital formation	2449	2443	2380	2636	3022	3378	3468	3818	4559	
7. Taxation	610	637	928	984	1103	1428	1374	1326	1558	
8. Interest charges	870	1026	1135	1393	1631	1722	1789	2050	2963	
9. Dividends	1614	1549	1424	1501	1500	1324	1433	1441	1489	
10. Bank Deposits	100	120	483	- 63	- 204	256	1148	2339	2662	
11. Profits and Taxes paid abroad net of overseas issues.	739	677	660	869	1027	1122	1389	1697	2237	
12. Increase in value of stock										
(a) physical increase	451	265	197	353	344	425	- 77	- 195	475	
(b) stock appreciation	256	304	154	465	609	907	852	1105	2516	
13. Other items	960	563	183	802	1097	895	- 466	1295	2437	
TOTAL	8049	7884	7544	8941	10129	10457	10910	14862	20896	

has left industry in a very restricted position from which to undertake its longer-term planning and capital budgeting: delaying the whole matter until such time as the position notably improves.

A marked turnaround in corporate liquidity was eventually achieved in the second and third quarters of 1975[1], and was attributed to the ameliorating effect of tax relief on stock appreciation introduced by the Chancellor in the Autumn 1974 budget[2]. Despite this surge in liquidity the corporate sector was still running a financial deficit of £3800 Million, and according to a Department of Industry survey[3] there was no intention of using this new source of funds for fresh investment. Indeed it was expected that the level of capital expenditure would fall by between 5 to 8% in 1976, following a decline in the previous years investment of 13%.

The liquidity that had become available in this period is thought to have either (i) been stored as a protective measure in readily accessible pockets of cash or Treasury Bills; or (ii) been used to restore overdraft and short-term debt facilities that had been heavily extended in previous periods (see line 2, Table 3.2); or (iii) been kept in reserve in readiness for the next up-swing in the economic cycle when it will be used to restore inventories and working capital

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1. U.K. Central Statistical Office report dated 20-1-1976.
2. It must be stressed, however, that this fiscal adjustment will only defer taxation payments: in future years the corporate cash-flow will be placed under an extra strain as taxation outflows effectively 'catch-up' (higher effective rates of tax being paid in these years). The measures initiated by the Chancellor have led to an increase in the holding of financial assets -- bank deposits, cash-in-hand, and Tressury Bills -- for U.K. companies during the six months to Sept. 1975 of £13,000 Million; or three times the level for the same period in 1974.
3. "Survey of Business Opinion" DOI. JANUARY 1976.

requirements.

This brief description of the liquidity position of the U.K. Corporate Sector indicates that many companies have been exposed to very serious cash-flow strains, particularly in 1974/1975. Looking at the last decade as a whole, it is quite clear that, whatever the cause, there has been a most remarkable deterioration in manufacturing industry; with real profits after proper adjustment for inflation becoming negative; with all aspects of working capital becoming more difficult to fund out of internal sources; and with the inevitable consequence of higher and higher levels of debt being employed to support the on-going levels of production. New equity capital, with the exception of the rights issues discussed earlier, has been practically non-existant. All of which, as the Department of Industry observed, has led management to suspend their investment programmes until it is quite apparent that a positive real return can be sustained on new capital investment.

The following section will now go on to discuss a method, termed LINKAGE-LEASING, which can be actively pursued by industry in an effort to boost their industrial spending on capital assets, without having to place still further strains on liquidity. One way in which Government actively attempts to intervene in the promotion of new investment in industry is through the system of Capital Allowances on plant and machinery. This boost to corporate cash flow does, however, cause marked fluctuations in the liquidity position of many companies. Furthermore, it has not always been possible for companies to exploit and fully utilise the available Allowances sometimes because the prevailing economic conditions have demanded a rigorous channeling of all available funds into the promotion of current operations and sometimes because inflation-induced cost increases combined with product price controls have reduced taxable profits to a level at which Capital Allowances against tax cannot be absorbed.

3.4 FINANCIAL LINKAGE[1]: THE ROLE OF LEASING IN FIXED CAPITAL AND WORKING CAPITAL FORMATION.

Throughout the period covered by the U.K. Industrial Survey[2], it was repeatedly stated by the managers and financial executives involved, that: although they had comprehensive capital expenditure programmes waiting to be implemented, the re-timing, scaling-down and even abandonment of replacement and expansionary investment was the result of a shortage of internally generated corporate funds.

Management attributed this shortage to the low rates of after-tax profitability being made by on-going and anticipated investment, together with the ever increasing drain upon cash-flow caused by the need to finance inflated costs of working capital.

In this section of the Chapter we are concerned with the influence of leasing in stabilising the random ebb and flow of funds between working capital and fixed capital, as a result of the outright purchase of assets and the subsequent receipt of the Capital Allowances. In response to the various economic pressures, an increasingly large amount of funds are having to be diverted into working capital; the effect of which is analogous to the application of a tourniquet to the flow of funds into fixed capital formation. This imbalance can be redressed by reducing the appropriation of funds to working capital (which is not always an advisable step if manufacturing levels are to be main-

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1. Financial linkage will be discussed again in the context of a feasible solution/methodology to the integrated investment and financing decisions. At this point we shall concentrate on the linkage and flow of funds into and out of the fixed and working capital of an organisation.
2. The results of which are to be found in Chapter 7.

tained) or by resource to externally generated finance (which as shown in Table 3.2, supra, and frequently confirmed in conversation, is an increasing necessity in Industry).

This position may be illustrated by means of a funds flow diagram which is intended to represent the cyclical nature of cash-flow through the organisation. Using as the starting point the top left-hand corner the input of debt and equity is shown being channeled into the fixed capital formation of the company. (see Fig. 3.1. overleaf).

This investment results in four forms of cash-flow: the normal operating flows obtained from the assets in their productive capacity; any Government grants which may attach to the assets; the associated Capital Allowances which, providing sufficient taxable profit exist, are a reduction of taxation outflows; and, finally, the salvage value of the plant and equipment. From this gross cash-flow is deducted the significant 'leakages' of Corporation Tax and debt servicing costs, leaving the residual to be divided between the payment of a dividend and corporate retentions.

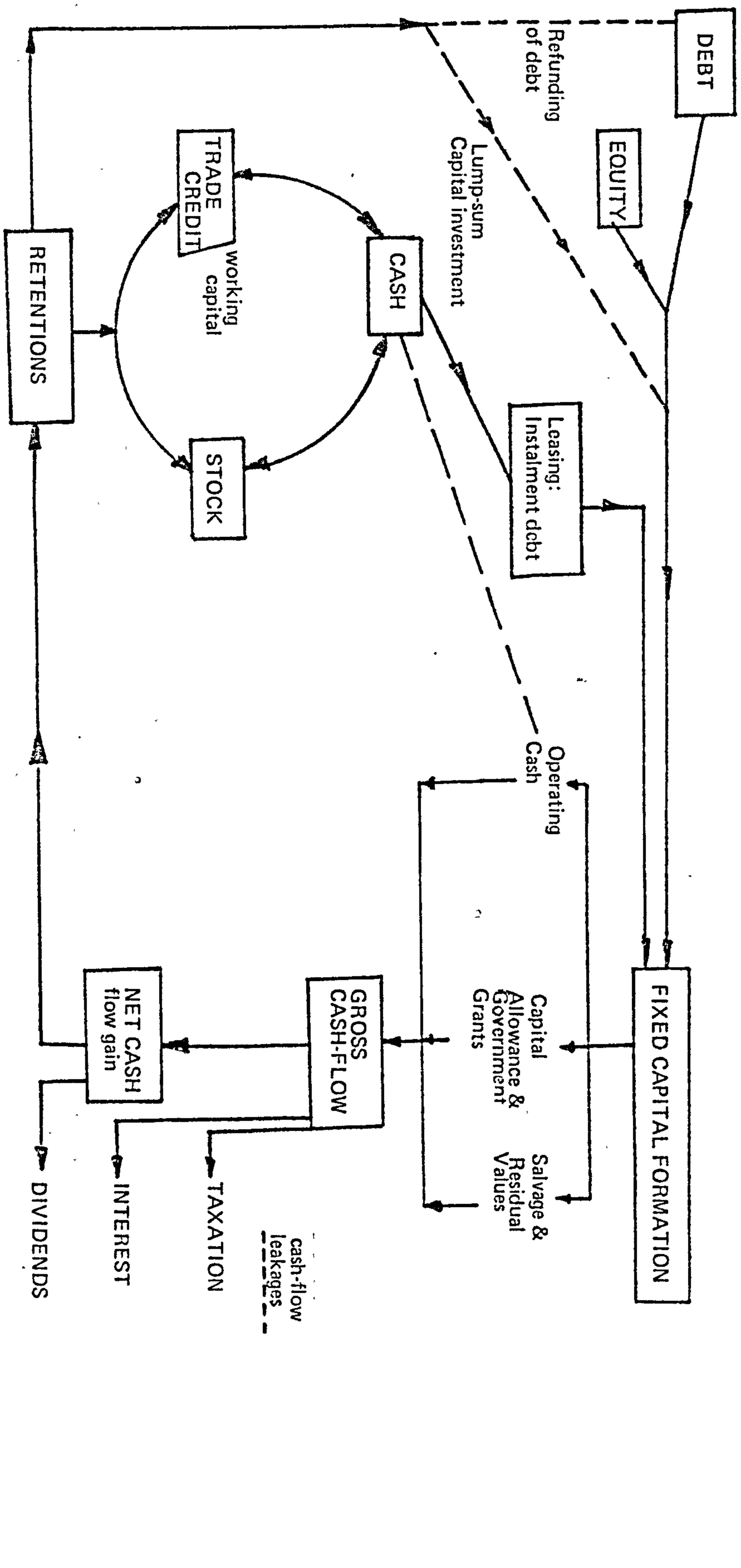
Whatever cash-flow is retained has three possible avenues of application: additions to working capital; the refunding of debt; and the creation of further lump-sum capital expenditures.

Consider now the problems that prevail when a company is experiencing difficulties in its profitability and liquidity, together with a general inflationary pressure on interest rates and most aspects of its working capital requirements. Thus, in terms of cash flow levels and circulation, the company's areas of greatest vulnerability are:

1. The permanent haemorrhage of cash out of the system due to taxation, interest and dividend payments.

FIGURE 3.1.

THE ROLE OF LEASING IN FIXED CAPITAL AND WORKING CAPITAL FORMATION



2. The need for a substantial diversion of resources into the pool of working capital in order to sustain production levels, to fund stocks and work-in-progress, and to maintain the terms of trade credit extended to customers.
3. The significant reduction, in response to items 1 and 2, of cash-flow available for new investment.

If two further considerations are now introduced, whose influence on the funds flow requirements of an organisation is to exacerbate the instability and cause abrupt fluctuations in the cash-flow cycle[1], the rôle of leasing in financial linkage[2] can be demonstrated.

Firstly consider the interposition of Capital Allowances in the cycle. In terms of the movement of cash-flow, the capital expenditure - Capital Allowance system introduces a considerable instability into the cash pattern of the company -- when the asset is purchased there is a sharp cash-outflow, which is then followed some time later by an equally sharp partial[3] recovery of funds as the allowances become operative. There is, however, a very important difference in the two portions of

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1. The concern with the variability of corporate cash-flow will be discussed further when Debt Capacity is considered. The arguments will not be defended here; but suffice it to say that, in general, a more realistic system of assessing the appropriate debt levels of a company will be enchanced by a stable cash-flow profile.
2. Financial linkage has been defined by FAWTHROP thus: [45p.195] "The ability of investment projects to generate funds for the financing of subsequent or contemporary projects either in the form of reinvestable cash-flows or hypothecable assets". See also FAWTHROP [45] and [46].
3. Partial because the 100% First Year Allowance has a cash-flow value only equal to the rate of Corporation Tax; currently the cash-flow recovery will be 52% of the value of the capital expenditure.

this cash-flow oscillation:

> While the cash-outflow is clearly fixed capital formation the cash-flow (at least in the first instance) is an accretion to working capital.

It is inadvisable to be too dogmatic about the latter half of this statement because the ultimate use of the cash-flow, saved by a reduction in Corporation Tax liability is a disguised and complex function of the "sources and uses of funds" matrix of an organisation. However, in the first instance (unless there is a deliberate policy to the contrary) the Capital Allowances will actuate a transfer of of funds from fixed capital to working capital within the company[1].

Central to the present discussion is the argument that during a period of high inflation and liquidity strains, there will be an induced tendency for the cash-flow generated by Capital Allowances to remain in working capital. For, if manufacturing output is to be maintained, this vital injection of funds[2] becomes irrecoverably enmeshed in the working capital of the organisation.

In consequence there is a break, or severe blockage, in the cash-flow cycle: resulting in curtailment of funds available for 'outright payment' capital expenditures.

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1. If a policy to utilise the Capital Allowances for further fixed capital formation is sanctioned and meticulously observed, then a full cycle of funds within the company is achieved. This, in turn, will start a further, albeit reduced, pattern of oscillation in period cash-flow.
2. To be more accurate this is a reduction of outflows ..... which in a period of financial stringency could be expected to be a thankful, but only briefly commented upon, alleviation of pressure (a subtle psychological difference existing in the minds of managers between the saving of an outflow and the receipt of a cash inflow). See DONALDSON [39, Chs. 7, 8 and 9].

It is contended here that this distortion of funds flow disposition within an organisation may, over time, have serious prejudical consequences upon the long-term growth rates of those companies subjected to the influences being discussed. And extending the impact of this argument into a more general context, it will be equally detrimental to the economy at large.

The second aspect of linkage is concerned with the stability or smoothing of interperiod cash-flows. The rôle of leasing in the linkage process is catalytic: it helps to dampen interperiod cash-flow variability by restoring the imbalance of funds disposition. There are three ways in which leasing makes a contribution to linkage:

1. A significant problem limiting the optimal exploitation of the linkage procedure is that capital expenditures, by their very nature, tend to involve the committment of large sums of cash. Thus, the cash-inflows generated by previously implemented capital expenditure projects would have to be aggregated (retained) until they reached a sufficient sum. The advent of Instalment Debt has provided an opportunity to modify this practice considerably. The importance of leasing in the linkage process is paramount:

<u>It provides the medium through which the cash-flows from current projects can be channeled into the immediate financing of subsequent capital expenditures.</u>

The alternative to this procedure is a period of deferment until such time as sufficient inflows have accumulated in the working capital of the organisation to expedite outright purchase capital

expenditures[1]. The convenience which leasing provides in quickly putting to use an asset in return for an initial instalment firstly speeds-up the acquisition of plant and equipment[2], and secondly, contributes to the stability of the company's overall cash-flow profile[3]

2. It has previously been noted that capital allowances are an oscillatory influence on period cash-flows. Furthermore, it has been argued that financial management is frequently subjected to a variety of manufacturing and production pressures which mitigate against the transfer of Capital Allowances out of working capital into fixed capital. The circumstances must now be considered under which the Capital Allowances will not become available at the earliest possible moment -- an event which, prima facie, will achieve an initial damping of sudden cash-flow movements (the Allowance would then be spread over several periods), but which will be a serious loss to the worth of the project (as it may depend heavily on the early receipt of this cash-flow for its viability).

Capital Allowances are to be set-off against the company's Corporation Tax liability and, as such, their realisable value is dependent, inter alia, upon the existence of sufficient taxable profits. However,

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1. This is the practical problem refered to at the start of this section of the Chapter.
2. A prime advantage inherent in the controlled application of linkage in the capital budgeting and financing process is the stimulus it provides to corporate growth: viz, the new plant and equipment will generate additional cash-flows which in turn can be pledged for still further leasing etc.
3. This stems from two causes: the ability to tailor the schedule of lease instalments to a given pattern over time; and secondly, because the initial cash disbursements are comparatively small, leasing provides the ability to postpone or bring forward asset acquisitions more easily without violently perturbing overall financing strategies.

given either:

(i) A sustained period of poor profitability; or

(ii) A deficiency of taxable profits in a given period due solely to the existence of substantial Capital Allowances generated by previous capital expenditures and brought forward unused to the given period;

then to incur any new capital expenditure will place in jeopardy the 'value' of their associated Capital Allowances.

In both cases, they will suffer a diminution of value due to an enforced deferment in their use; or, they may be regarded as lost altogether until such a time when sufficient taxable profits arise to absorb the accumulated Allowances --- which, from a discounting viewpoint, may be 'prudently' regarded as sufficiently distant as to be of little consequence or worth[1].

In this situation capital investment programmes become subject to serious revision: the value of the Allowances in NPV terms are generally a substantial fillip to the profitability of the asset; so much so that their delay may prejudice the project's implementation. Here leasing

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1. Advanced Corporation Tax constitutes yet a further drain upon corporate liquidity (ACT is discussed again later in Chapter 6). Low profits and high capital allowances combine to reduce taxable profits to a level where many companies are in danger of losing, or at any rate significantly defering, the ability to set-off ACT against Corporation Tax: with a consequent risk of unrelieved ACT leading to a higher effective level of taxation (see BUCKLEY [27]). Nor should it be overlooked in the context of the shift of operations overseas, which many companies are undertaking to participate in the higher levels of profitability to be gained there, the fact that ACT is not available for the purposes of calculating double taxation relief. For a detailed and complex study of the impact of taxation and inflation upon corporate liquidity, see LAWSON [84]

offers a unique advantage; for instead of postponing or even forfeiting the allowances they can be "sold" or transferred to a leasing subsidiary of a major bank with substantial taxable profits. In exchange the lessor will offer a reduced schedule of lease instalment payments[1].

3. The third contribution of leasing is shown diagramatically on the flow of funds chart previously presented. It has been indicated that the payment of lease instalments is out of the working capital of the organisation. This statement is justified on the following, partly empirical partly deductive, grounds:

   1. During the interviews conducted as part of the Industrial Survey, it was found that the overwhelming majority of financial executives treated lease repayments as a form of operating cost which would be discharged out of the cash balances on hand. In conversation most executives argued that this represented the simplest and most effective method of payment; for the sums involved, no other form of action was considered necessary.
   2. The suggested alternative to this was to establish a 'back-to-back' funding operation (that is: the pyramiding of debt: one source of finance would become available on the appropriate date

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1. A discounted evaluation of the trade-off is necessary to ensure the viability of this approach: namely, the DCF value of the allowances (on the assumption that they will be received in period t+?), versus, the DCF value of the reduction in lease payments brought about through the sale of the allowances. Given a favourable comparison, leasing provides, prima facie, a smoothing and improvement in cash-flow together with a 'lifting' or amelioration in profitability. Clearly, there is a greater incentive to undertake fixed capital formation if the leasing terms reflect the allowances which, under the 'purchase' alternative, would be lost or reduced. For a further discussion of this problem see Chapter 8.

to support the repayment of another source). However, for most of the companies interviewed such devices were hypothetical, being frequently too costly and too complicated for the leasing agreements they envisaged undertaking[1]. Discussions with several lessors did suggest that for very large leases it would not be uncommon for them to arrange such complex funding operations with their parent bank if they thought the circumstances warranted it.

To summarize the argument, it may be stressed that the 'linkage' of working capital and fixed capital through the use of leasing leads to an important rectification of the previously noted distortion in the company's overall funds disposition (see the diagram on page 128). The periodic drain of large sums of cash-flow from the pool of working capital, which previously had to be removed from their productive rôle, accumulated and withdrawn to fund the capital expenditure programme, is thereby mollified.

LINKAGE-LEASING assists both the fixed and working capital structure of a company by utilising their inter-relationship in a complementary strategy: firstly, this procedure withdraws a much smaller amount from the working capital component when the asset is first commisioned, the instalment payments are spread over a period of years; and, secondly, the capital expenditures which result from the leasing arrangements will generate new cash-flows which will be reintroduced into the pool and in turn used to support still further leasing.

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1. The company's overdraft facility is here excluded, as it is assumed to be an integral part of the working capital system.

Once underway the procedure can achieve a self-supporting posture: the quantity of leasing in use is a function of the level of working capital, which is a function of the generation of cash-flow from the assets which are leased. This process must be controlled however; and how this constraint is incorporated into the LINKAGE-LEASING strategy will be discussed later. Meanwhile it is noted that linkage achieves a congruency, or integration, of the company's investment and financing plans.

3.5. CONCLUSION

The purpose of this Chapter has been two-fold:

firstly, an attempt has been made to demonstrate the very forbidding economic environment in which corporate financial management has had to make decisions; and, secondly, given that companies are experiencing problems with their financing, liquidity and in some cases viability, a means of alleviating some of these difficulties has been suggested termed LINKAGE-LEASING.

The principal conclusions regarding the industrial environment, and its influence upon the investment and financing decisions of an organisation, may be summarized thus:

(1) During the mid 1970's there has been a most conspicuous increase in the use of debt financing by U.K. industry --- with the quantity of debt in use reaching unprecedented sums. However, most of this increase represented a disconcerting reliance on short-term debt and overdraft facilities. Despite this surge in debt usage, the U.K. is still relatively low geared by comparison with its international competitors (see Figure 4.7, Chapter 4).

(2) There has existed very high rates of interest on corporate debt during this period. This has, inter alia, (i) had the effect of discouraging new capital expenditure because of the prohibitively high returns required from the asset to fund the capital, and (ii) it has placed a significant increase on the immutable prior claims on corporate cash-flow, thereby increasing the risk of illiquidity.

(3) There has been severe pressure on all aspects of working capital,

with very significant inputs of capital being required to sustain levels of production. This has been partially, but only temporarily, ameliorated by the granting of tax relief on stock appreciation.

(4) Real profits, adjusted for the effects of inflation, have been diminishing rapidly in recent years to the extent that some commentators argue that in several sectors of industry it is currently negative.

(5) Companies have experienced great pressure on their liquidity throughout the period.

(6) Industrial productivity has been low in the U.K. and has not matched our European competitors.

(7) The level of investment in fixed capital formation has deteriorated and is regarded by many authorities to be in need of a substantial fillip if the U.K. is to compete effectively in world markets.

(8) Managerial confidence has been low in view of all the foregoing factors, which has resulted in a reluctance to invest in new plant and machinery until the prospects for a real return seem secure.

(9) Instalment Debt, leasing, has been one of the few consistently available sources of medium term debt available throughout the period, filling what for some companies may be a financing gap.

The latter half of the Chapter, concerning LINKAGE-LEASING, attempted to establish a means whereby companies could relieve some of the above problems. The intention of LINKAGE-LEASING is to stimulate and increase the levels of fixed capital formation while <u>simultaneously</u> assisting

cash-flow stability and relieving some of the pressures on working capital. It was argued that LINKAGE-LEASING can restore the often disturbing funds flow disposition of a company caused by an outright purchase/Capital Allowance system. The paramount relevance of Instalment Debt in stabilising the periodic ebb and flow of funds into and out of working capital was also demonstrated.

CHAPTER 4

THE CONCEPTUAL FRAMEWORK: ISSUES IN FINANCIAL THEORY OF RELEVANCE TO THE LEASING DECISION

4.1 INTRODUCTION

Any basic analysis of the leasing decision should be concerned to provide a methodology whereby the various elements of that decision can be defined, quantified and appraised. The fundamental question to be answered is: shall the company lease a particular asset or shall it not; and, if so, which leasing contract shall be used.

The elements of the analysis will be the cash-flows generated by the decision compared against some accept/reject criterion.

Further reflection, however, quickly brings about a realisation that this basic analysis is insufficient. The leasing decision is unique in that it is at one and the same time a decision to acquire the asset and a decision as to how that acquisition is to be financed.

Traditionally, these two decisions -- the investment and the financing decisions (henceforth the I & F decisions) -- have been separated, both in theory and in practice.

The challenge posed by the leasing decision -- that the two be integrated -- necessitates a preliminary examination of the issues involved in this aspect of financial management.

Stemming from this consideration are other contributory issues which must also be discussed fully if the particular richness of the leasing decision is to be appreciated.

Leasing is a form of debt and, therefore, two principal questions must be considered: how much debt should an organisation use; and what is the rôle of debt in the total capital structure of the organisation?

The analysis of the leasing decision itself utilises a discounting approach which, quite clearly, requires the selection and use of a cri-

terion accept/reject rate. It will be taken as axiomatic that such a rate is in some way related to the corporate cost of capital. At once the question arises: to what extent is the leasing decision analysis to take into account the impact of changes in the capital structure and the use of debt on the very criterion rate which is the key element in the analysis? The interactivity is quite apparent. These are issues which form the financial policy matrix within which the specific leasing decision must be taken. The leasing decision must be consistent with all other elements in that matrix, and by implication these elements must be considered before the leasing decision itself, forming as they do the constraints to which the leasing decision must be subject.

Thus, the large balance of this Chapter moves away from the immediate leasing decision to consider those elements of the conceptual framework within which that decision must be set. Given that a substantial part of the whole body of financial theory is contained within these elements, it must follow that the present discussion must be eclectic in its content and summary in its presentation.

Advantage will be taken, however, to comment upon the methodologies which have been used to deal with the many interdependencies which exist between the elements of this conceptual framework: with the place of leasing within these methodologies being reconsidered as part of the discussion in Chapter 5 (where corporate taxation and mathematical modeling will be considered).

As a guide to the ensuing discussion in this Chapter, the following issues will be raised:

1. What is the significance of the integration of the I & F decisions?
   What methods may be used to examine such integrated decisions?
2. What is the appropriate hurdle rate to use in integrated decisions?

3. What is meant by the "debt capacity" of a company?

   What constrains the development of the capital structure?

   How are decisions on debt levels and financing mix made in industry?

   Do companies have a pre-arranged "Strategy of Financial Mobility"

   to be used in the event of unexpected peril or unexpected opportuni-

   ty?

   Is there evidence of such a strategy in U.K. industry?

4.2 INTEGRATING THE INVESTMENT AND FINANCING DECISIONS

Much of the early writing on capital budgeting[1] was founded on the concept that the investment decision could and should be administered separately from the associated financing decisions of the company. The justification for conducting the analysis of the two problems independently, undoubtedly had its roots in the concept that a pre-determinable, stable and supposedly optimum capital structure existed towards which all companies gravitated[2]. The convenience of this assumption was most beneficial in the field of financing policy with debt and equity being supposedly raised and employed in fixed proportion to each other.

However, current literature[3] on financial management is questioning the artificial separation of the two decisions and considering the problem anew. Firstly through the medium of financial models which attempt to integrate the two decisions, and secondly via an approach which examines a single investment project plus its associated financing decision.

1. The first approach seeks to integrate the entire set of investment and financing decisions. This is most notable in the body of lite-

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1. See FISHER [56], MODIGLIANI & MILLER [100]; SOLOMON [151], WESTON & BRIGHAM [145], VANCIL [136], VAN HORNE [139].
2. It is a moot point, however, as to whether management (and indeed some theorists) were of the opinion that market forces alone would ensure that the company would acquire an optimal capital structure; or, given the often prudent, historical perspective of bankers (and perhaps to a lesser extent financial analysts) a company's current policy would be granted institutional approval if it did not exceed the accepted norms. Capital structure, as DONALDSON [39] noted, would thus become sanctified through the passing of time, rather than through considered analytical judgement.
3. See CHAMBERS [30], PETERSON [111], WEINGARTER [142], DONALDSON [40], AMEY [1], CARLETON [29], LUSZTIG & SCHWAB [90], HALSTEN [69], & MYERS [105].

rature which is concerned with modeling the two processes of a company in such a way as reproduce a simultaneous, optimal, solution to both problems. Integration takes place through the use of Linear Programming Mathematical Models which require a complete specification of the project opportunities available to a company upto the model's "horizon" (which may, for example, be five years hence) together with a list of accessible financial sources, the limits of their availability and their cost. It is claimed that such models provide the necessary (perhaps the only) framework within which to analyse the subtle interactivities of the two decisions.

2. The second approach is concerned with an independent investment decision and its accompanying funding decision. This area has particular relevance to the leasing decision because when a company leases it must make a simultaneous judgement on the profitability of the proposal together with a choice as to the most appropriate financial source to fund the project.

Prima facie, it would appear that the first approach affords a more comprehensive and internally consistent methodology: but the second affords particularly detached insights into the integrated decision process.

4.3 INTERACTIVITIES AND INTERDEPENDENCIES

It can be argued that, other than in the artificial circumstances of the perfect capital market[1], the separation of the I & F decisions is an oversimplification which may have quite serious and detrimental effects upon capital budgeting and evaluation procedures.

The traditional basis upon which the integration of the two decisions is proposed, is concerned with a complex computational interdependency which occurs in the capital budgeting procedure, when the corporate "borrowing rate" and "lending rate" diverge (technically: a state of capital rationing). The interdependency is rooted in several basic tenets of financial theory and is sometimes refered to as HIRSHLEIFER'S PARADOX[2].

In his now classic paper [75] HIRSHLEIFER argued that the use of a discount rate based upon the weighted average cost of capital, would, in such circumstances, be "at best only a partial indicator of optimal investments" because it failed to consider the associated financing decision. Thus, he argued that the aggregate impact of the company's investment decisions would determine the required total of finance needed to support the investment programme. The cost of that finance - - the cost of capital, the minimum criterion rate in any discounting

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1. See MODIGLIANI & MILLER [100]. Throughout this discussion emphasis will be placed on 'practical', imperfect market conditions; with subsequent analytical procedures to solve the leasing decision being firmly based on a desire to evaluate the problem within the bounds of these frequently difficult. but nonetheless, pragmatic conditions.
2. See HIRSHLEIFER [75, pp329-72] or [76, CH 3]. Resolution of this paradox will not be considered in this Chapter; fuller comment is delayed until the discussion on financial modeling in Chapter 5.

procedure -- will be influenced by the quantity of capital that is to be raised and by the mix of different types of capital that are to be employed.

The interdependency can be stated thus: the corporate "borrowing rate" (the market cost of capital to the company) can only be determined after the results of the investment decisions have established the demand for funds. However, until the amount of capital to be raised is known, the discounted cash-flow hurdle rate cannot be determined (assuming that the cost of funds is sufficiently affected by the demand for it). But, the demand for capital can only be confirmed once a schedule of accepted projects is available.

The circularity frustrates an immediate solution because it is impossible to assess which projects will be accepted until the appropriate hurdle rate has been established; but the hurdle rate is only known once the final group of investments has been accepted.

A similar interrelationship can also be observed in the taxation consequences of the 'lease or buy' decision.

The policy of separating the investment and financing decisions quite frequently results in the absurdity of accepting an investment project (after bringing into account the Capital Allowances which will enure to the outright-purchase of the asset), only to subsequently scrutinize the financing of that project by alternative leasing contracts none of which would generate those Capital Allowances. Thus, the possibility of the receipt of a Capital Allowance as part of the outright-purchase decision means that the investment decision cannot be finalised until the related financing decision is concluded. Conversely, the means by which the asset is to be financed cannot be evaluated until the investment decision is resolved.

The circular nature of the above interdependencies leads inevitably to the conclusion that both aspects of the decision process should be considered simultaneously if the interrelationships are to be satisfactorily resolved.

Two further interactivities need briefly to be mentioned in the capital budgeting process: namely, the effects of investment risk[1] and financial risk upon the cost of capital. The first interrelationship concerns the nature and mix of accepted capital expenditures upon the corporate risk posture in the eyes of the capital market, bankers and other suppliers of capital. Thus, if a company is seen to be adventuring further into risky types of capital expenditure then -- in the absence of portfolio-type activities elsewhere which may compensate or negate this risk[2] -- it will be a reasonable supposition that suppliers of capital will require a compensatingly higher rate of return if they are to supply new funds (or maintain their existing supply) to the organisation.

If the risk posture is sufficiently changed by the combined influence of the investment decisions then it may result in an increase in the various yields required on the component parts of the cost of capital. It would follow that the capital budgeting system (being esentially a static-

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1. The impact of Investment Risk upon the cost of capital is a function of the level of correlation between the expected return of the project and that of all the other projects that comprise the company. See MAO [93 ,pp375/6].
2. Interactivity between the projects within the accepted set may produce aggregated yields, or cash-flow profiles, that are positively/negatively correlated to each other. This may lead to more or less stability in the equity return; an increase or decrease in security for the creditors; with the ultimate result being an increase or decrease in the overall cost of capital. See MAO [93, p376].

equilibrium representation of corporate activity) may fail to take proper account of the investment risk attributes of the projects under consideration, and in consequence accept a set of projects which results in an increase in the yield criterion against which their initial acceptance was posited[1].

Mention has already been made of financial risk in the HIRSHLEIFER' paradox: this is the phenomenon whereby changes in capital structure may precipitate a re-adjustment of the current yields required on the present sources of corporate funds.

This is a very real problem to practicing management because, perceiving the quantity of capital required to fund the investment programme, some decision must be made on the strategic "mix" of capital to be raised -- so much in equity capital, so much long-term debt, so much leasing etc.. The suppliers of these different sorts of capital, perceiving the proposed and current financial mix, will form their impressions of the financial risk posture of the organisation. This will influence their present and future expectations regarding dividend and/or interest -- the elements of the cost of capital discount rate -- resulting in a change in hurdle rate.

This is a much more subtle interactivity which in practice is very dif-

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1. In practice this problem is by no means easy to solve. To do so would necessitate the analyst having detailed prior knowledge of the behaviour of different cost schedules for various sources of funds as they respond to changes in the capital mix. (This topic is discussed further in the context of a "Strategy of Financial Mobility" later in this Chapter). Nonetheless, this interactivity is present and has been the subject of debate for many years: See SOLOMON [151, p153].

ficult to detect[1]. Exactly how shareholders, bankers, finance companies etc., react to changes in the capital mix of an organisation when such changes take place is by no means clear[2]. Industrial research carried out as part of this Thesis, see section 4.7, has indicated that Bankers and other professional people tend to work on rule-of-thumb Balance Sheet ratios and profits forecast when discussing capital issues of all sorts ..... but just how the market as a whole reacts to changes in capital structure when it is presented to them as a 'fait accompli' is not at all clear. What other research that has been carried out in the U.K. -- notably the extensive pioneering survey of Fisons Ltd., by BRISTON [22] and later by REDWOOD [114] -- has shown how difficult it is to elicit a uniform, representatieve view of shareholder opinion (on financing policy for example) that may guide and benefit management when making such decisions.

INTERIM SUMMARY

There can be little doubt that the interdependencies and interactivities that have so far been discussed are issues of fundamental importance to practising finamcial management.

Any leasing decision analysis which lays claim to being comprehensive

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1. Vide: the conflicting statistical evidence used as testimony in the MM vs. traditional school debate on capital structure: see MM [150], WESTON [144] and BARGES [10]. For a discussion and critisism of the various approaches used, inferences drawn, and validity of the data samples used, see MAO [93 ,pp441-52].
2. And it is frequently a delayed reaction occuring sufficiently hence to be submerged in a sea of other events, any one of which may also have contributed to the change in required yields.

must acknowledge that, because of the inherent interdependencies which accompany the integration of the I & F decisions, the final solution procedure is subject to implicit errors. The inter-relationships thus far considered are certainly complex and often very subtle: but an ability to specify the nature of the intricacy does not imply an ability to model the process.

Argument now follows as to what is the appropriate discount rate to use in an integrated decision model: this involves a consideration of capital rationing.

4.4. THE MARGINAL EFFICIENCY OF CAPITAL

As will become clear in Chapter 6, when the opinions of other writers on leasing will be discussed, there is extensive debate in the literature as to what is the appropriate discount rate to use in the leasing decision. Broadly, three categories may be distinguished (1) the weighted average cost of capital (2) the marginal efficiency of capital, and (3) the implicit interest rate of the lease contract. Debate on the latter category is delayed until the next Chapter when the Value Additivity Principle will be examined within the general context of "discriminatory financing".

HIRSHLEIFER [75] has demonstrated that when capital markets are imperfect a company's borrowing rate and lending rate diverge. In such circumstances, the weighted average cost of capital is shown to be irrelevant as an acceptance criterion and has to be replaced by the mar-

ginal investment opportunity rate[1]. As WEINGARTNER [142] then proceeded to indicate, in the context of mathematical programming models of the capital rationing problem, the task of investment appraisal then becomes one of optimally matching the "pool" of funds to the "pool" of projects[2].

Capital rationing has been extensively debated in the literature from two standpoints: firstly there has been disagreement as to what was the precise rationale governing the quantitative limit on funds available for investment; and, secondly, the finance/operational research literature has been concerned to model the process and discuss the results in meaningful economic terms.

Within the former debate two opposing views emerge which have been broadly categorised as "hard" and "soft" rationing.

HARD RATIONING[3]

Advocates of "hard" rationing argue that when a company is, perhaps, subject to a poor credit rating as a result of high levels of indebtedness, or is in an industry with potentially high risk, then the firm will face a steeply rising marginal cost of funds. When this occurs, the prohibitive cost of finance creates an absolute limit on funds.

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1. That is, when capital rationing exists, the lending rate in project selection becomes the IRR of the marginally rejected project not accepted due to the constraint on capital .... the problem clarified by HIRSHLEIFER is that the marginally rejected project can only be identified once the optimal solution has been attained.
2. The concept of opposing pools of funds and projects is that of VANCIL [136]. It exemplifies the need to optimize the aggregate of capital expenditure decisions rather than to optimize each project on a one-by-one basis.
3. Notable writers who concur with this view are BAUMOL & QUANDT [13], AMEY & EGGINGTON [2] and MAO [93].

This may take three forms: (1) the company's Bankers refuse to extend further credit facilities , (2) the company may be at the limit of its Directors Borrowing Powers as laid down by the Articles of Association[1], or (3) there exists a contractual limit to borrowing specified in a Trust Deed, or restrictive covenant, which circumscribes new fund raising activities. Thus, "hard" rationing is taken to imply that projects may only be financed out of internally generated funds (the external sources being depleted; as per category 1).

However, it is argued here that <u>"hard" rationing is frequently behavioural rather than factual</u>: management BELIEVES that there are no external funds available, and so acts as if there <u>was</u> "hard" rationing. (This statement will be re-examined when debt capacity is discussed in section 4.6, and later when the leasing strategy termed "Spill-Over" is introduced in Chapter 7).

<u>SOFT RATIONING[2]</u>

A company is subject to "soft" rationing quite often at its own discretion: an internal constraint is observed by management on the level of finance available for projects. This may take the form of an administrative device to budget the pool of funds between, say, divisions; or it may be a self imposed restriction on funds distribution which is part

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1. This reason is not always inflexible as (i) it depends on the interpretation of "borrowing", which may not include leasing for example, (ii) it is always possible to call an AGM to alter the limit (easy enough in a small company, although it may be a more complex operation in large companies), and (iii) there is always an element of convenient forgetfulness as to the existence of such clauses.

2. Notable writers who concur with this view are HIRSHLEIFER [75], WEINGARTNER [142] and CARLETON [29].

of a strategy (often mistaken) to raise the overall return on capital[1]. "Soft" rationing is often a reflection of the frequently met managerial prejudice against the use of debt. Besides being considered morally wrong, the management of such companies believe that recourse to debt can, in the final analysis, only lead to a dilution of managerial power and control.

This reluctance to use debt may also be a product of financial conservatism .... the current proportion of debt does not disturb the historically conformed to debt-equity ratio; or it may be a more sophisticated approach (advocated in this Thesis) which takes into account the possible repercusions from a change in debt levels upon the maximum sustainable limit which can currently be supported by the cash-flow being generated.

One further approach to the concept of "soft" rationing is based on the belief that a sector of the financial market is in a temporary stage of saturation (as in the case of the rights issue market in the latter half of 1975). Reasonable advice would then suggest that a request for this form of funds, at this particular moment, would be incorrectly timed.

A corresponding problem to this rests in the inconvenience, not to mention external scrutiny, that accompanies a visit to the market: if funds are raised piecemeal it often creates the illusion of poor financial planning, and, because of transaction costs, it can often prove expensive (the market takes a more benevolent view of large, preferably infrequent, issues). Furthermore, once a new equity or major debt operation is foreseen by the company current spending will be

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1. If an artificially high hurdle rate is used to screen projects then many of the essential medium-profit activities will be rejected often in favour of investment which carry an unduly high level of risk or uncertainty of return.

curtailed so as to avoid placing an intolerable strain on existing resorces which may precipitate, or otherwise prejudice, the fund raising operation. It must also be remembered that the company will be subject to what is perhaps a vital period of delay from inception of the fund raising exercise to receipt of the finance which may contribute to the rationing problem.

4.5. THE APPROPRIATE DISCOUNT RATE TO BE USED IN THE LEASING DECISION

In Chapter 3, the concept of "LINKAGE-LEASING" was introduced as a method to enable companies to circumvent some of the problems of working capital financing and to encourage fixed capital formation. The proposed "LINKAGE-LEASING" package can therefore be seen to offer a most valuable corporate strategy: in that it assists in the stipulated relaxation of what otherwise would be an unacceptable capital rationing situation. That is, funded debt, retained earnings and equity provide insufficient finance for the projects under review and therefore as an intermediate measure the company has recourse to a planned amount of Instalment Debt (planned as per the considerations to be discussed further in section 4.6)[1]. Consequently, the capital rationing constraint

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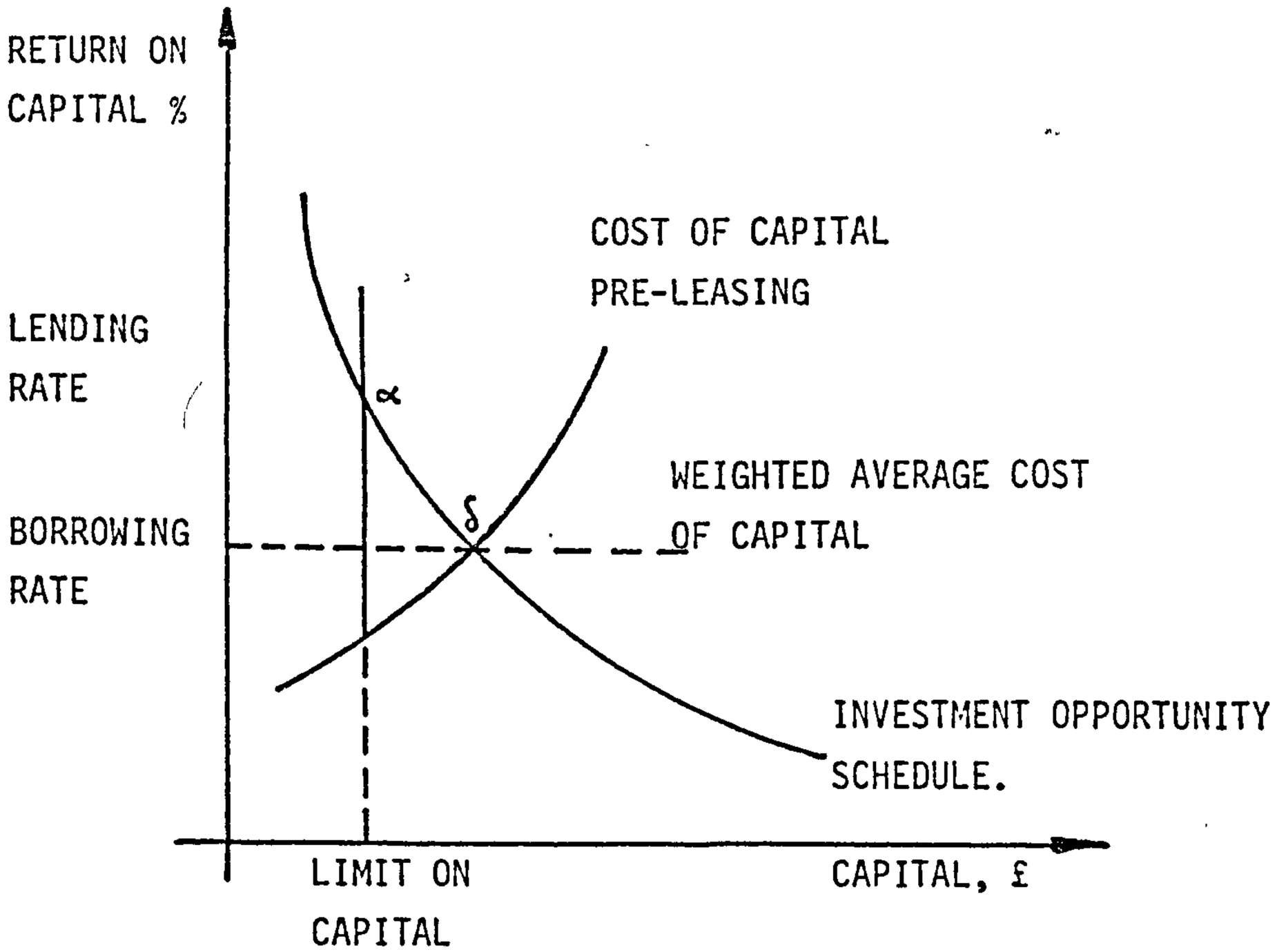
1. To preface this debate: it will be argued that the exact way in which the planned share is determined will NOT be a function of some Balance Sheet ratio. Rather, it is a question of establishing the ability of a firm's cash-flows (generated by the ultimate set of accepted projects after 'LINKAGE-LEASING' has been optimised) to service and liquidate the existing debt plus newly introduced debt -- what has been termed the 'debt supportiveness of cash-flow'. As such, any constraint placed on the level of leasing to be employed will not be predeterminable or rigid, but it will depend upon the contribution made by the cash-flow of all accepted projects to the debt capacity of the company. It will be appreciated that this is a complex and intricate routine which would require considerable sophistication in the application of an iterative technique. An initial attempt to solve this problem will be made. The reader is also refered to the two texts of DONALDSON [39] & [40].

may still pertain, albeit not as tightly.

It is possible to illustrate the concept of 'LINKAGE-LEASING' in the single-period case, by using the investment opportunity schedule[1] facing the company before and after the use of leasing. (It is recognised that this is a highly-simplified illustration, nonetheless it does provide an important insight into the problem of establishing a correct discount rate for the leasing decision. The multiperiod case cannot be shown diagrammatically in other than n-dimensional space).

FIGURE 4.1

THE NON-CAPITAL RATIONING EQUILIBRIUM POINT



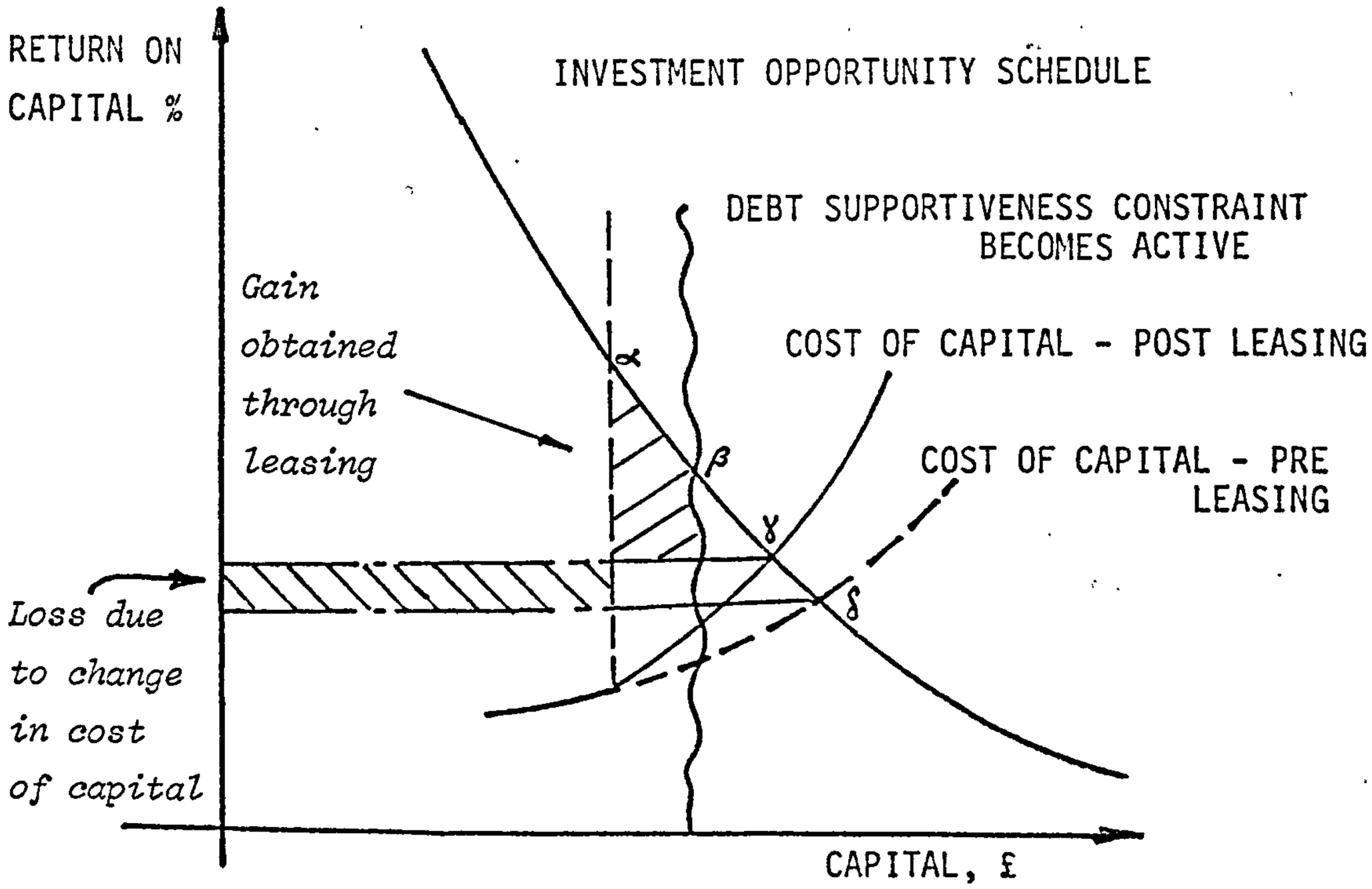
1. For further discussion of Figure 4.1, see MERRET & SYKES [98 ,pp111-114].

The company can only attain position α on the investment opportunity schedule because of the intervention of the capital rationing constraint. Economic logic, however, would signal the company to accept projects upto the intersection of the investment opportunity schedule and the cost of capital curve at the point δ --- the non-capital rationing equilibrium point.

With the introduction of leasing, see Figure 4.2, the capital rationing contraint softens and the company can move down the curve to an area approximating to β: on the assumption that the 'debt-supportiveness of cash-flow' constraint[1] becomes binding before equilibrium is reached, thereby preventing some of the projects being undertaken between β and γ

FIGURE 4.2

LINKAGE-LEASING: THE DISCOUNT RATE PROBLEM



1. See footnote 1, page 157. The basic concept is that although Instalment Debt relaxes a hard capital rationing constraint, the ability of cash-flows to service instalment debt is a decreasing function of the amount of debt taken up. A partial rationing situation results, which approaches, but does not totally converge upon, the non-rationing equilibrium point.

Hence, the ultimately chosen mix of projects and new finance will be determined by the intervention of the 'debt-supportiveness' constraint. Unfortunately, the position of β is indeterminate at the commencement of the capital budgeting exercise. As HIRSHLEIFER and WEINGARTNER have noted, it is this intermediate stage α-β in the integrated investment and financing decision which has presented a series of complex problems in the identification of an appropriate hurdle rate. The interdependency between the injection of new funds and the appraisal criteria used (especially if the capital equilibrium point is not reached .... position γ in Figure 4.2.) is incapable of being adquately acknowledged by anything other than a dynamic hurdle rate[1]. Thus, because the leasing decision is a simultaneous I & F decision, one of the more pertinent critisisms which may be leveled at any lease algorithm is that it will be static in nature: the decision procedure, and in particular, the hurdle rate can never be representative of the true situation. Because of the dynamic nature of the problem it is argued to be currently impossible to cope adequately (optimally) with the inherent complexities of a truly rigorously integrated system.

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1. To clarify this term: a dynamic hurdle rate would start from a value based upon the existing cost of capital of the company, but would vary with each iteration of the analysis to reflect either the marginal efficiency of capital, or the new cost of capital which has arisen because of the introduction of new funds into the company.
Prima facie, mathematical modeling approaches to the joint I & F decisions would appear to present the ideal solution to this problem. However, it will be argued in the next Chapter that the very structure of such models forces the joint decision towards an artificial, totally stable, hurdle rate at the horizon.

Until a truly viable technique presents itself[1] and resolves this most intractable problem, it must be openly recognised and accepted that any leasing decision procedure will be fallible on this issue.

RECOMMENDATION

The determination of the 'correct' discount rate remains a major obstacle in any lease analysis. It has been argued that for the discount rate to correctly reflect the inherent dynamic instability of the integrated decision system, it would be necessary to have advanced knowledge of the final solution (the appropriate cost of capital or marginal efficiency of capital is not known until the problem is complete). Thus, in the absence of a method to establish the suitable marginal efficiency of capital, it would appear that there are two alternative, practical, solutions to the discount rate problem:

1. The pre-leasing weighted average cost of capital

   This would be quite acceptable if the extent of leasing to be undertaken was not large enough to disturb materially the original cost of capital, and there existed a non-capital rationing situation on completion

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1. And BAUMOL & QUANDT [13] suggest this to be unlikely. Their argument may be summarised thus: If, in a mathematical programming formulation of the joint I & F decision, the objective function is the maximisation of net present value; then, if the discount rate used is determined by the dual evaluators (the dynamic concept outlined above) the only solution is a trivial one. However, see ASHTON & ATKINS [6]. Their paper suggests that while on the contrary it is mathematically possible to prove that a solution other than a trivial one exists, the answer depends upon the assumptions related to the consumption time preference (utility function) of the shareholders. The core of the B & Q problem still remains, however. This problem is re-examined in Chapter 5 section 3, when financial modeling is considered.

of the joint analysis (that is, funds supply and funds demand had been balanced through leasing).

2. The post-leasing weighted average cost of capital

If it is assumed that (i) the initial posture of the company indicates a severe capital rationing problem in view of the quantity of funds currently available, and (ii) the 'debt-supportiveness' constraint indicated that a large tranche of leasing could safely be used: then it would be necessary to estimate what the assumed post-leasing cost of capital would be if all the available leasing capacity was to be employed to alleviate the capital rationing problem.

An immediate problem with both approaches is that they can be said to pre-judge part of the simultaneous solution: they assume, implicity and explicity respectively, that the financing decision has been made. Clearly, the use of either figure will cause the answer to be inaccurate; but their use is, in part, vindicated as the most suitable, if not the only surrogate available.

Further discussion of the discount rate in the leasing decision will be undertaken in section 5.1 of the next Chapter, but the above recommendation will remain.

4.6 CORPORATE DEBT CAPACITY AND FINANCIAL LINKAGE

I INTRODUCTION

What follows is a pragmatically oriented discussion of two important aspects of financial management - - the DEBT SUPPORTIVE (SERVICING) CAPACITY OF CORPORATE CASH FLOWS and FINANCIAL LINKAGE -- both of which rely upon the judicious use of leasing if their contribution to the company's financing strategies are to be optimally exploited.

The ensuing examination of these issues reveals a strong inter-relationship between linkage and debt capacity that embraces all the company's investment and financing decisions. In summary, linkage will be seen to involve the 'shifting' of project opportunities between different time periods and the concurrent re-arrangement of financing patterns which accompany those investments. It will be noted that the management of the linkage process requires the smoothing and/or supporting of the corporate cash-flow profile in anticipation of improving the debt bearing capacity of the organisation. This raises the question of how debt capacity should be measured, which leads to the argument that it is a function of ("free") cash-flow. The following stage of the discussion relates to the exploitation of the expected improvement in debt capacity and asks the question : which debt source should be introduced to optimally exploit this capacity, and has leasing any special qualities or facets which make it an attractive candidate? It will be argued that because of the exceptional flexibility of lease financing ("tailor-made" contracts) it can make a most significant

contribution to linkage and corporate profitability. Finally, an examination is made of a slightly modified linkage process which provides a simple, albeit robust, mechanism for identifying and re-distributing free cash-flows so that they can be used to fund new projects through leasing.

It should be noted at this stage that it is possible to examine linkage from either of two standpoints. Financial linkage can be achieved by the relatively simple application of an iterative procedure[1]; or it may be an inherent feature of a sophisticated mathematical programming model of the investment and financing decisions[2]. In keeping with the development of the argument thus far in the Thesis, concern will first be given to the FAWTHROP methodology. Further discussion of the role of linkage in financial modeling will be delayed until Chapter 5 where the relevance of linkage to project appraisal criteria will also be considered.

II THE DEBT SUPPORTIVE CAPACITY OF FREE CASH-FLOWS

Broadly, the corporate risk which is associated with the use of debt financing can be said to consist of two elements:

1. That debt servicing payments will so absorb the after-tax net cash-flow that there are no funds available for distribution to the shareholders; and

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1. Vide, FAWTHROP [46] and [153]
2. Vide, CHAMBERS [30]

2. That the after-tax net cash-flow will be inadequate to service debt so that at best corporate management will be seriously hampered in the direction of the organisations affairs, or at worst the organisation itself will have to be wound-up and its assets realised to satisfy the suppliers of debt capital.

The argument as to what constitutes the real debt capacity of a company must, therefore, be firmly grounded in cash-flow terms ... for in the end it is cash and not Balance Sheet ratios which repay debt. Historically, however, the surety to a lender of debt capital has lain in:

(A) The capacity of the company to service and repay the debt -- which has often been crudely and incorrectly signalled by[1]: (i) a debt/equity ratio, and/or; (ii) a cover ratio; and,

(B) The collateral offered by the asset involved.

As will be reported later in section 4.7, when the results of part of the supporting field research are considered, cash-flow forecasts and analyses now replace (A) as a more immediately relevant signal of corporate debt capacity. (However, given the fallibility of forecasts they are not necessarily, but they are

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1. It is argued that DONALDSON is correct when he dismisses the traditional Balance Sheet debt-equity ratio as being an "unnecessarily crude and unreliable way of expressing debt bearing standards." [39, p150]

hopefully, a more correct signal[1]). Asset collateral still remains, but it is more explicitly recognised today that exercising the collateral can leave the financial institution concerned with more problems than it had anticipated. Preference is clearly given to the repayment of the debt.

DONALDSON argues that while the Balance Sheet debt/equity ratio is certainly a simple, commonly understood, and widely used method of specifying corporate debt capacity, it is often granted a precision which it quite simply does not possess:

> "Standards tend to remain fixed over an indefinite time and providing that they are sufficiently conservative, experience only tends to confirm their validity. One of the dangers of a fixed single standard (of debt capacity) is that it gives the unwarrented impression of absoluteness. At times such a standard appears to be employed as if debt up to some pre-determined level involves no risk but beyond that level produces a sharp and unacceptable increase in risk. This can be very dangerous thinking."
>
> DONALDSON [39, pp 145/46]

The traditional measures of debt capacity, it is argued, fail to take into account the unique circumstances of the company -- in particular its periodic cash-flow pattern -- which are absolutely crutial when setting debt standards. In place of the more usual debt policy based upon a debt-equity ratio (which in terms of empirically observed policy-making often implies a

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1. "We might not hit "bulls-eye", but at least we are shooting at the right target." - - private correspondence with the Assistant General Manager of a leading U.K. finance institution.

compliance with some industrial average ratio[1]), DONALDSON substitutes an internal analysis of a company's ability to service debt commitments in the event of a prolonged (simulated) recession befalling the company which produces a consequent reduction in cash-inflows.

The thrust of DONALDSON'S argument is directed towards a company's capacity to withstand the "maximum adverse" operating conditions it is likely to encounter. The extent of that capacity is in terms of whether sufficient net operating cash-flows exist, over the duration of such conditions, to cover the immutable prior claims caused by existing debt levels plus any other unavoidable outflows which have to be continued irrespective of the prevailing conditions.

Any excess of cover, above an agreed contingency or safety margin, is argued to be an index of underutilised borrowing capacity.

This argument has been amended slightly by FAWTHROP into a debt strategy under normal on-going conditions; the writer concurs with the viewpoint expressed:

> "What ought to matter is not some arbitary ratio of debt to equity, but the ability of a firm's cash-flow to service and liquidate debt - what might be termed the 'debt supportive capacity of cash-flow'."
>
> FAWTHROP [45, p195]

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1. As DONALDSON critically notes of this policy : "The hazards inherent in an approach to policy formulation where everyone looked at his neighbour for guidance are readily apparent." [39, p92] See also section 4.7 infra.

Debt capacity is here argued to be a positive increasing function, firstly, of the magnitude of positive corporate cash-flow, and secondly, but equally importantly, cash-flow stability[1] over time. These relationships will be pursued further in the ensuing discussions, but it is considered worthwhile to stress at this point the fundamental relevance of cash-flow stability in financial management.

During the associated field research a large number of conversations with Bankers of all sorts developed clear evidence that a company which furnishes some indication of a stable cash-flow profile throughout the period for which the loan is required, might well evoke a more sympathetic leader response[2] than a company which presents a very volatile series of periodic cash-flows which in certain years fell to potentially hazardous low levels. Thus it is hypothesised, as a general banking/financing principle, that : the more stable the cash-flow series is, and the higher is

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1. See BARGES [10]: or BENISHAY [16]who found, for example, that there existed a significant positive correlation between shareprice and stability of earnings.

2. Typified by an increased confidence in the borrower's ability to repay and a willingness of the lender to extend further debt facilities.

the lowest cash-flow in the series, the higher will be the borrowing capacity of the organisation[1]. As will be noted in section 4.7 later, the stability of cash-flow is highly valued by Bankers and suppliers of industrial debt : when asked[2] whether in their professional opinion the stability of cash-flow was synonomous with a reduced level of risk for the suppliers of debt capital, there was a consistent positive response that it was.

Thus, much significance is placed upon a company actively striving to achieve a stable, controlled, cash-flow series. This clearly implies that management should devote a considerable amount of time and resources to that end -- the results of which will be subject to a great deal of external scrutiny and

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1. Strictly, such a hypothesis should be shown to be valid by some statistical enquiry. However, it is argued that to do so would be a major piece of research in itself given that the Banker's "yes or no" to the borrowing application is a function of many imputs of which cash-flow stability is but one. It would be necessary to capture data on a large population of Banker's decisions and to devise an appropriate multiple regression, or analysis of variance, test.

   To capture the data on an ex-post basis would be to prejudice the accuracy of the analysis (guide lines to bank officers are not sufficiently developed to ensure total consistency between decision variables and the decision itself) and an ex-ante operation would require resources of time not available to this researcher.

2. Either in private conversation, as part of the field research, or on mutually attended courses.

assessment by the lenders of capital. Financial managements attention, therefore, must be drawn to one important caveat : the increased discipline and stewardship required under such a system demands that management must meet budget submissions, forward plans, goals and targets in cash-flow terms --- which is a far more exacting and professional task than being simply expected to maintain a debt-equity ratio.

Thus, the following propositions have now been established : (i) the use of a debt-equity ratio as an index of debt capacity is unreliable and unnecessarily coarse; (ii) preference should be given to an analysis of the debt bearing capacity of cash-flow, which will be a unique measure for each company and each set of circumstances; and finally (iii) cash-flow stability is a desirable corporate objective.

In the ensuing discussion of financial linkage reference will be made to the terms : "free cash-flow" and "residual or latent free cash-flow"; these will now be defined. In practice when management is instigating the proposal under deliberation the analysts would have to quantify each item on a period-by-period basis when conducting their own internal analysis of their company's debt capacity. The cash-flows described below are based upon forecasted (expected) investment and financing plans which are anticipated to be implemented by the company over its planning period. Thus:

DEBT CAPACITY = f (CF)

FREE CASH-FLOW = CF-(DE+TL+DIV+RES(EXT+CON))

RESIDUAL (LATENT) DEBT CAPACITY[1] = f (FREE CASH FLOW - DSC)

1. Residual debt capacity implies under-utilised or un-tapped debt capacity, and not the size of pre-negotiated debt reserves.

where

CF = Total gross cash-flow of the company from operations and investments.

DSC = The contractual debt servicing costs of interest and capital on existing sources of debt.

DE = Discretionary (cancellable) expenditure such as R.&D., Marketing, etc; capital expenditure is a special form of this category.

TL = Tax liability due in each period.

DIV = Planned distributional outflows

RES = Precautionary reserves of liquidity, which may be EXT(RES) = extant reserves, such as minimum levels of cash balances and deposits; or CON(RES) = contingent reserves such as commitment fees payable or compensating balances, or any pre-negotiated emergency lines of credit.

III. FINANCIAL LINKAGE

If a company wishes to exploit fully the process of financial linkage then it is essential that efforts be made to maximise simultaneously its debt-supportive capacity of cash-flow. In the previous section it was argued that undue fluctuations in the company's cash-flow pattern were to be avoided. Bankers and Finance House representatives repeatedly indicated during the Industrial Survey that, in their view, large variations in cash-flow levels on behalf of a client company would clearly be seen as a sign of liquidity weakness --- that is, it would be taken to tacitly imply that management was not firmly in control

of the company's cash-flow supply and demand and, as such, the Bank's position in the organisation was put to additional risk. In debt negotiations, a preference was increasingly being shown for a reasonable degree of uniformity in the client's cash-flow submission because this constituted a positive indication that the company was actively concerned about liquidity levels and their capacity to service the newer higher levels of immutable prior claims thereon.

Concern was also being given by the Banks to the 'expected minimum' level of cash-flow that the client was anticipated to achieve over the planning period under review : for the lower this figure was, the lower would be the company's maximum sustainable debt capacity. Clearly, the Bank's expressed a distinct unwillingness to extend debt facilities whose servicing costs (in combination with the company's other expected cash-outflows) would come perilously close to the level of cash-flow which would be expected in the least advantageous cash-flow circumstances.

Thus, in addition to stabilising the company's overall cash-flow profile, management should also endeavour to raise the "weakest link" - or the lowest element in the projected cash-flow series - if debt capacity is to be maximised. This can be achieved in two ways:

(i) through the re-scheduling of project starting dates so that cash-flow peaks and troughs can be smoothed-out by regulating capital expenditure outflows, Capital Allowance inflows and the method of financing this expenditure[1]; and,

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1. The introduction to certain aspects of this discussion is to be found in section 3.3, p122 et. seq.

(ii) by undertaking projects which, although they may have a relatively poor NPV, nevertheless provide a cash-flow pattern which boosts corporate liquidity in a period when additional funds could be profitably used to support other alternative investment opportunities which otherwise could not be initiated at that time.

The process of financial linkage, as FAWTHROP [46] demonstrates[1], embodies these two requisite characteristics as part of an integrated investment and financial planning system. In the application of linkage, projects are selected as much on the basis of their contribution to corporate liquidity during specific periods, as to present or future profitability. Equally, linkage places considerable value on the ability of positive cash-flows, derived from implemented projects, to be channeled towards the generation and support of new debt capital.

The framework and rationale of linkage utilises the simple concept that project cash-inflows become an important source of funds for new investment. However, this can be achieved in two distinct ways : either directly, by the immediate application of those funds into productive investment; or more subtly, through the pledging of those funds to the servicing requirements of further debt which in turn can be transformed into new investment.

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1. For a complete numerical illustration of this method which describes the concept of financial linkage and cash-flow inter-period smoothing, see FAWTHROP [46] or [153] It would clearly be tedious to repeat here (without very restrictive editing) the extensive and detailed exemplar model developed by FAWTHROP.

Within this framework, the multi-period management of the linkage process is closely allied to the borrowing capacity of the organisation. The major influences on cash-flow, the capital investment in projects, must be re-timed or 'shifted' in order to achieve the following central objectives which equate linkage management and debt capacity :

(a) "smoothing" -- corporate cash-flow should be smoothed in order to minimise the inter-period fluctuations; and

(b) "supporting" -- the minimum period cash-flow should be maximised to raise the level of the "weakest link".

The concepts of "smoothing" and "supporting" are prominent facets of linkage because they effect a re-distribution of free cash-flow between the various planning periods and capital budgets. The re-allocation will improve the borrowing capacity of the organisation by transforming the same aggregate of free cash-flow into a more efficient borrowing base.

One problem with the concepts of "smoothing" and "supporting" is that although both aim to improve the debt capacity of the company by increasing the security and supply of funds to the capital suppliers, the two objectives are not necessarily consistent. For example, a "supporting" shift of funds may indeed lift the period cash-flow minimum .... but it may also simultaneously increase the period cash-flow maxima even further, thereby increasing the inter-period variability.

A further problem arises over the question of what type of borrowing to raise in order to absorb the increase in debt capacity made available by the "smoothing" and "supporting" procedure. It will readily be appreciated that there is an almost limitless assortment of debt instruments available.[1] Without a policy directive, the corporate treasurer would have to exercise a good deal of subjective judgement in order to blend fluctuating patterns of free cash-flow and possible debt alternatives over a multi-period horizon.

It is argued below that there are compelling reasons why leasing should be chosen on its intrinsic merits alone to constitute the principal financing instrument used in linkage.[2] However, the problems associated with cash-flow "smoothing" and "supporting" which stem directly from the need to move projects between periods, frequently makes the management of the linkage process difficult. An amendment to linkage, which hopes to achieve the same objectives but using a much simpler procedure, will now be proposed.

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1. For example, any combination of : maturity -- long, medium or short term -- or immediate recall debt which may take funded, hypothocated, conditional or instalment form; different termination agreements such as balloon payments, sinking fund, or convertibility; and alteration conditions in the form of indentures or covenants; commitment fees and compensating balances will further widen the range of possible instruments.

2. The choice of leasing is in part a reflection of the managerial preoccupation with this type of finance as a major form of industrial instalment debt. See section 7.2, Chapter 7.

IV. LINKAGE-LEASING

The role of leasing in what may be termed LINKAGE-LEASING is optimally to exploit the fluctuations present in the company's latent borrowing capacity which has been identified through the analysis and enumeration of residual free cash-flow. The application of leasing to absorb the inherent borrowing capacity available in this "un-committed" free cash-flow, enables the company to promote additional investment opportunities in those periods when a surplus of free cash-flow is recognised.

The supremely versatile nature of leasing makes it the most appropriate and convenient vehicle for such an enterprise in two ways :

(i) the periodic lease repayment schedule will distribute the effect of a capital expenditure's cost over several years, thereby avoiding the sharp fluctuations in cash-flow caused by the outright purchase of the asset and the receipt of the Capital Allowance;

(ii) the facility offered by Lessors to arrange 'tailor-made' financing schemes means that a leasing contract, or more probably a group of contracts, can be negotiated and designed which will mirror and fully harness the company's unique pattern of available free cash-flow. It is argued that other forms of (non-instalment) debt do not provide the same degree of flexibility afforded by a well planned leasing scheme.

It is this elasticity of financing payments which provides the key to the proposed amendment to financial linkage. For, if leasing schedules can be judiciously tailored[1] then it follows that they can be designed to complement, or fit, the pre-linkage management free cash-flow profile.[2] Leasing provides an alternative use of free cash-flow because, with few exceptions, a lease agreement could be arranged which will optimally exploit the possible variations and inconstancies of this resource.

Consideration will now be given to the problems associated with how the proposed LINKAGE-LEASING system would operate and be implemented in practice. It should be noted that the proposal about to be outlined is relatively simple, in that management could apply it without the assistance of extensive computational aids and, in consequence, the process may well be sub-optimal.

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1. As indeed they can : see the reply to question QL5 in the Lessor survey, section 7.3, Chapter 7.

2. That is, the free cash-flow pattern resulting from the basic selection of investment projects and accompanying financing plans, but prior to the introduction of leasing.

Arguably optimality is not that critical : the characteristic sought is feasibility rather than rigour or elegance in model construction.

As a basis for discussion four central topics will be raised which together form the substance of the suggested scheme:

I. What quantity of debt can a known pattern of free cash-flow support?

2. What is the optimal, or 'best' feasible, apportionment of free cash-flow between lease contracts and other existing and competing forms of debt?

3. What projects are to form the list of potentially leaseable investments and which are to be purchased outright?

4. How are the incremental benefits created by the introduction of leasing to be quantified?

Consider the first two issues together : it is proposed that the exploitation of an organisation's debt-supportive capacity can best be accomplished in two distinct yet complementary steps:

Firstly: management must decide upon the financial mix which the company intends to employ in the CENTRAL CORE of debt.

(The argument to follow assumes that management has formed an appropriate conclusion -- taking into account all the unique circumstances, market forces and risk attitudes of the company -- about the mix of principal debt resources it wishes to employ. These decisions should be made in full cognizance of the debt-supportive conditions that pertain at the time

each individual tranche is raised and clearly should not contravene any constraint on debt usage that these may imply. However, the precise rationale governing the evolution and selection of a specific strategic debt mix is not at issue here. No exemplar solution can, or should, be given as to what constitutes the optimal debt configuration for all circumstances, conditions and industries because the matrix of decision variables which influences the choice of a particular portfolio is unique to each company).

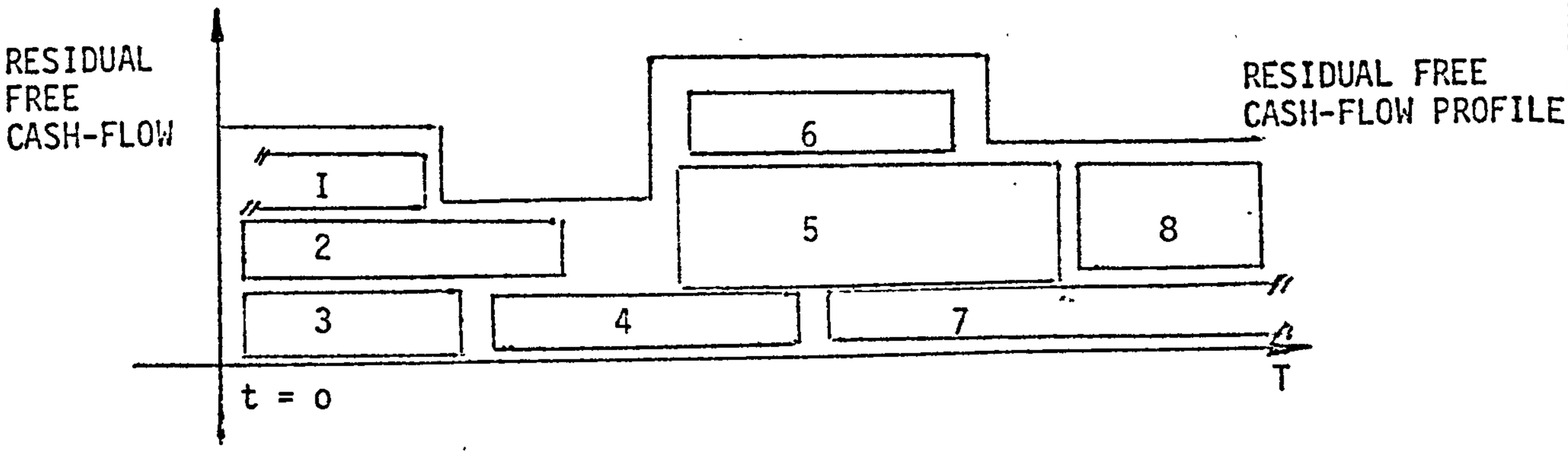
Secondly: to achieve maximum exploitation, management must simultaneously complement the above poljcy with a package of lease contracts which will be used to consume the residual fluctuations in free cash-flow, which remain after the servicing costs of 'core' debt have been deducted. The precise manner in which this 'package of instalment debt' will be established requires a procedure to deploy "blocks" of residual free cash-flow in lease contracts.

The basis of this procedure is shown in Figure 4.3 below. It assumes that management has established the period-by-period residual cash-flow pattern and is attempting to match it with debt contracts (exactly how it has performed this operation will not be considered at this point). The various "blocks" of Figure 4.3 represent different lease agreements. The height of each block denotes the amount of free cash-flow thus absorbed --

shown in this example by leases employing consistent payment schedules, although complementary non-uniform schedules could be employed where relevant -- and the length of each block depicts the duration of each contract.

FIGURE 4.3

LEASING AND THE EXPLOITATION OF RESIDUAL FREE CASH FLOW



It is argued that the 'best' feasible exploitation of the residual free cash-flow is attained when a set of project opportunities and lease contracts are found which simultaneously achieve:

(i) the highest set net present value (in conjunction with the outright purchase project set financed by long-term funds), whilst,

(ii) leaving the minimum quantity of free cash-flow unused.

Consider the second objective. It is argued that the volume of free cash-flow pledged to new lease contracts will rarely be totally exhausted, inevitably some un-pledged funds will remain. There are four possible reasons for this:

I. A lack of confidence on the part of management that the

assessment of free cash-flow is sufficiently accurate : as more debt is approved the estimate of how much free cash-flow remains becomes more unpredictable. In effect, the nearer the margin the more uncertain that margin becomes.

2. (i) The cost of debt will be an increasing function of its utilisation and as a result larger quantities of free cash-flow are required to support the same level of instalment debt[1]; and,

   (ii) Given a finite marginal efficiency of capital curve, the need for debt will decrease after a certain point because there are no perceived opportunities left to utilise it.

3. In reality it will not be possible to obtain such finely tailored lease contracts to ensure that every last penny of free cash-flow can be exploited. The best that management can do is attempt to keep such quantities of unused borrowing potential to a minimum. However, as additional quantities of debt are undertaken to this end, it will

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1. As FAWTHROP notes [46,p17]: "By a strict relating of borrowing power to truly free cash-flow; and by recognising that financial risk is an increasing function of gearing (so that the amount of free cash-flow committed to new debt is generally a declining proportion of the available quantity of free cash-flow) excessive pyramiding of debt is avoided."

become increasingly difficult to find projects which have complementary starting dates, duration, and repayment schedule to precisely match the last remaining fluctuation in cash-flow.

4. Cash is not the only resource consumed in project implementation. There may be equally binding constraints of human resources, or of institutional resources such as necessary planning permission. Where overseas investment is involved, there may be organisational constraints such as the required percentage of local ownership.

It should be noted (in anticipation of the evaluation procedures to be developed in this Thesis and the results of the Industrial Survey relating to observed leasing strategies in practice) that there are three leasing cash-flows implicit in diagram 4.3.

ONE Cash-flow relating to those leasing commitments already entered into and forming part of the on-going cash-flows. Hopefully these will have been accepted in accordance with the integrated lease valuation model proposed in Chapter 9.

TWO Leasing commitments now being entered into as part of the "core" financing programme of new projects (see page 178) and which will have been decided upon as part of same integrated evaluation procedures developed later in the Thesis.

THREE Leasing commitments entered into as part of the exploitation of the debt servicing capacity of cash-flows.

Such leasing decisions might be termed 'second-line' decisions which are still within the planned financing mix[1] : for the strategic exploitation of borrowing capacity is part of the master financing plan. Again, therefore, the integrated valuation model would be used. However, it must be conceded that at the margin of the financial plan some leasing decisions will have strong undertones of "spill-over financing".[1] This would imply that the valuation procedure appropriate to that type of leasing decision was used. It may well be that in such cases there will be a certain ambiguity as to whether the leasing decision is "planned financing mix" or "spill-over", and a subjective judgement might be necessary to resolve what is, after all, a largely philosophical question. It seems reasonable to suppose however, that the number or value of such leasing decisions would be small.

It will be recalled that the prime purpose of LINKAGE-LEASING is to utilise the residual cash-flow resources to generate new projects through leasing. By implication, therefore, a group of acceptable projects must exist immediately prior to this analysis if any residual cash-flows are to be available for distribution.

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1. Defined in Chapter 7.

Thus, a very important question lies at the heart of the LINKAGE-LEASING recommendation : which projects constitute the potential group of investments to be tested for possible funding by leasing? Rationally and economically the answer would appear to be : choose those projects which when financed in this manner produce the maximum return to the company. Unfortunately such an apparently obvious solution contains a most serious practical weakness : namely, to ensure 'optimality' management must obtain potential lease contracts for every project under consideration and evaluate every possible combination of alternatives, if it is to guarantee that the best amalgamation of outright purchase and leasing has been attained. The impracticability of this approach is self-evident and in the interests of feasibility and the attainment of a workable procedure, a compromise solution must be found.

It is proposed that the selection of potentially-leasable projects be confined to the following project opportunities and concurrent cash-flow circumstances:

ONE The collection of projects which are more open to lease financing because of the competitive terms they can be expected to attract : viz, certain TYPES of equipment -- especially computers, transport fleets, certain production equipment, etc., -- which possess the joint

characteristics of large capital outlay and a limited engineering or technological lifespan.[1]

TWO Specific situations which (on an ad hoc, prima facie basis) appear to deserve closer management scrutiny to assess whether significant linkage benefits can be derived from them. Two typical examples will serve to illustrate this point; the first relates to capital shortage at the time of the analysis, and the second relates to an expected capital deficit during some future budgeting period. Thus, management must look for : (a) projects whose adoption is justified on profitability grounds but whose timing is coincidental with a trough in cash-flow, or whose collective capital outlay would cause an excessively sharp dip in an otherwise satisfactory level of free cash-flow; and (b) projects which may not be profitable themselves but which provide a boost of cash-flow at a much needed time, thereby allowing other projects to be undertaken which could not otherwise be funded.

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1. More specifically, equipment which the company anticipates a continued use of over the planning horizon (and beyond) but which may be subject to a catastrophic loss of value as a result of technological break-throughs etc. The leasing relationship offers a degree of security because, in such an event, the lessee can "trade-up" -- enter a new lease and surrender the old contract thereby securing the newer, more expensive equipment. The issue of leasing as a hedge against technological obsolescence is discussed by FAWTHROP [153].

It follows from what has been said in Two above, that within LINKAGE-LEASING it is the marginal projects which will be funded by leasing. This implies a specific ordering of financing events : 'buy' the most profitable projects then if possible, lease as many of the remaining projects which are unaccepted but nonetheless profitable.

Arguably, a genuine case for concern can be expressed about matching lease financing to the "least attractive" investment opportunities. Why should the 'best' and by implication most profitable, projects be bought outright?[1]

This is a perplexing question which is extremely difficult to answer satisfactorily. It involves a circularity in capital budgeting/financing policy : the distribution of the company's pool of funds to project opportunities can be undertaken in the sequence, buy some projects then lease some of the remainder; or,

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1. An argument is raised at this point but its quantitative implications are not pursued further until the discussion of RESIDUAL CAPITAL BALANCES in Chapter 9.

   Consider the following. If the final financing solution indicates a mixture of leasing and outright-purchase capital expenditure, then it is argued that there is a critical interdependence of existence between the two groups of projects. The number of projects which are leased depends upon the number of projects which are bought, and vice versa. Any redistribution of the pool affects the total number of projects undertaken.

   If the full set of accepted investments is to be initiated, then those projects which are leased could be said to have 'surrendered' their privilege to be bought and in consequence, effectively re-allocated some of the capital they would have absorbed to other outright-purchase projects.

   Thus, if (as a result of a methodological convention) the allocation of capital is such that the leased projects, perforce, offer relatively poor returns in comparison with 'bought' investments then, in a truly equitable appraisal, the leased project should receive some credit -- a notional redistribution of return -- for enabling the 'best' projects to be bought outright. The opportunity cost RESIDUAL CAPITAL BALANCES analysis considers this problem.

equally possible, the analyst could decide to commence the sequence by leasing a group of assets (which may contain some of the most profitable opportunities) and then buy whatever is available with the remaining funds.

It is difficult to state categorically that one approach is superior to the other, except that logically the quantification of available residual free cash-flow and its pledging to leasing can only be initiated and later optimised once the donating projects have been accepted and the relevant cash-flows established.[1] The issue is further complicated, however, when one considers that the linkage procedure is by nature iterative : the smoothing of inter-period cash-flow leads to an identification of the company's latent debt capacity which once identified, can be used to fund other projects; however, each new project which is funded in this manner will simultaneously absorb and generate free cash-flow, thereby enabling the system to 'organically' grow; the constraint on this process being the limit to debt-supportive capacity of cash-flow.

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1. The quantification of residual free cash-flow will, of course, be on an AFTER TAX basis. This presupposes that the associated problems of taxation assessment, incidence and timing have been satisfactorily resolved. These issues, while subsumed in the above analysis, are nevertheless of major consequence to capital budgeting and the LINKAGE-LEASING procedure. In consequence, taxation is discussed at length in Chapter 5.

Manifestly, the circumstances call for an iterative model capable of evaluating the many interactions and quantifying the repercussive effects of the adoption of one project (however financed) upon the remainder of the group. (Such a financial model will be discussed in the following Chapter).

What procedure should be adopted by an organisation without major modeling facilities yet which wants to exploit its full borrowing potential? It has been argued thus far, that two groups of cash-flows can be allocated to leasing : (a) the profile of residual free cash-flow; and (b) a re-distribution of the "pool" of funds which ordinarily finance outright-purchase capital expenditure[1]. The most effective (non-modeling) sequence, therefore, requires a specific ordering of investment and financing events[2] which may be demonstrated using the following single-period illustration:

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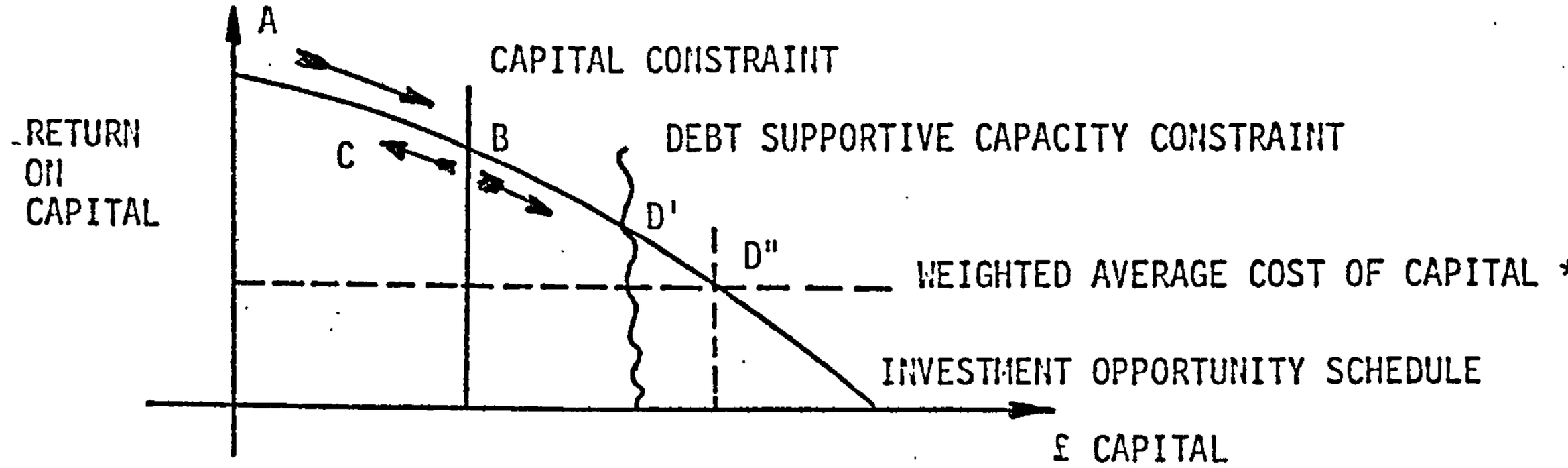
1. By definition (a) is dependent on (b) : the amount of funds committed to outright purchase will regulate the quantity of residual free cash-flow.

2. Which are as close to the concept of a simultaneous consideration of the I & F decisions as possible.

FIGURE 4.4

OUTRIGHT PURCHASE AND LEASING WITHIN THE CAPITAL BUDGETING PROCESS[1]



* N.B. The weighted average cost of capital curve may rise after the introduction of leasing.

The sequence would then be as follows:

A-B (i) projects accepted using own funds.

(ii) cash-flow pattern evolves; free cash-flow quantified and allocated to "core" debt sources.

(iii) residual free cash-flow identified and period-by-period profile established.

B-C & B-D'/D" both occur simultaneously upon near completion of A-B

B-C (i) redistribution of the pool of funds as a result of introducing leasing.

(ii) decision choice between using own funds to buy projects between B-C or lease those between B-D' or B-D"

(iii) various leasing repayment schedules - "blocks" - compete to optimally exploit the residual free cash flow profile.

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1. This diagram is considered further in section 4.6,V.

B-D'/D'': (i) elasticity of project set created through leasing, more projects undertaken between B-D' or B-D''.

(ii) either debt-supportive capacity of cash-flow constraint intervenes at D'; or weighted average cost of capital, which has risen to D'' through lease financing, curtails investment.

Within this proposed LINKAGE-LEASING framework three facets of the leasing decision emerge and compete for priority:

I. Choose the lease which has the lowest NPV-cost.

2. Choose the lease which creates the best linkage and debt-supportive capacity cash-flows.

3. Choose the lease which optimally exploits, and hence best mirrors or fits, the jagged profile of residual free cash-flow.

These criteria do not necessarily coincide and it is possible that they may not even produce the same answer. For example, hypothesise a lease versus debt comparison within the above framework. Suppose that the debt alternative emerges - by an agreed method of analysis - as the 'cheapest' source of funds. However, it is only available on fixed terms and cannot be'tailored'. Which financing source does the company choose? Either (a) the cheapest type of debt, even though it may make the cash-flow profile worse; or (b) the leasing option which, although more costly, nevertheless leads to a better utilisation of free cash-flow? The selection of a source of funds <u>just because it appears to be the cheapest</u> could well turn out to be a myopic appraisal which has neglected more critical aspects of the decision. When viewed within a wider perspective the analysis has overlooked the repercussions of the decision upon the company's debt supportive

capacity, the effects on cash-flow smoothing and supporting, the contribution to linkage, and the manner in which the project absorbs residual free cash-flow.

Within this complex and interwoven framework leasing can be seen to play a considerably more influential role in corporate affairs than a simple least-cost comparison could denote or than has hitherto been recognised in the literature.

Patently, however, to OPTIMISE the collection of variables and concepts listed above would require a dauntingly complex iterative process[1] : the construction of which, though highly valuable, lies outside the time available to the researcher. Summarising the arguments presented thus far under the general framework of LINKAGE-LEASING management, a less ambitious and less intricate procedure emerges which is hopefully economically and computationally efficient, robust and feasible.

Thus, management should adopt the following capital Budgeting/lease

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1. Arguably stretching beyond the scope of the most advanced models currently available : see Chapter 5, section 5.3.

financing sequence in order to enlarge the number of investment opportunities undertaken through the exploitation of latent debt capacity.[1] Thus management should:

I. Establish the marginal efficiency of capital discount rate which selects the optimal set of outright-purchase investments for a given pool of funds.

2. Determine the initial free cash-flow and residual free cash-flow patterns using the previous definitions.

3. Do sufficient profitable, but as yet unaccepted, projects exist to warrant a determined search for new sources of funds to boost the existing pool?

4. If yes, then the next step involves the simultaneous consideration of the 'elasticity' of the available internal funds and the expansion of the project set by re-allocating previous outright-purchase cash-flow expenditure to new lease contracts. This implies a shrinking of the funds allocated to 'buy' projects which will trigger-off an expansion of the total set of investments through leasing.

5. Management enters into lease contracts for those projects which are around, both above and below, the marginal efficiency of capital hurdle rate, and for those projects which may rank below the weighted-average cost of capital but which have advantageous and complementary cash-flow profiles to those

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1. It cannot be stressed too firmly that this proposal is not an optimal procedure; rather, as previously stated, it is hopefully a realistic and feasible approach to a most complex iterative problem.

established at stage 2. The contracts should be flexible, relatively impermanent and securable quickly so that the available investment opportunities may be taken and commenced on schedule.

6. With the aid of this newly acquired financing data (and the previous cash-flow information pertaining to on-going activities and the provisionally accepted set of outright-purchase projects) management begins the iterative scheduling of leasable projects to complement the 'own-funds' set and to utilise the latent debt capacity inherent in the specific residual free cash-flow pattern.
7. The 'best' solution is attained when the full LINKAGE/LEASING potential has been derived from the cash-flow pattern and the highest total-set NPV achieved.

Clearly, this course of action lacks many of the refinements and subtleties inherent in a full financial model. Nevertheless, it is put forward as an interim methodology, capable of implementation by the many companies who do not have the resources to instigate a more powerful mathematical programming solution to linkage.[1]

It will be observed that two leasing criteria lie at the heart of the procedure : (i) the "lease or buy" decision; and (ii) the use of leasing to optimally absorb residual free cash-flow. For the purposes of the proposal the first criterion depends upon a decision algorithm, which will be fully explored in Chapter 9; the second criterion, however, relies upon iteration and inspection which

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1. It is important to reflect that financial models are by no means free from theoretical and practical difficulties as will be discussed in Chapter 5.

although prone to inaccuracies are none the less sufficiently precise for the suggested proposal.

V. COROLLARY : CAPITAL RATIONING AND PROJECT INDIVISIBILITIES

Two important corollaries follow from the arguments presented above. Earlier in this Chapter it was noted that previous writers on the topic of capital rationing would divide it into two categories, referred to as "hard" and "soft" rationing. However, it is now argued that these classifications are spurious and the rationing of capital, per se, is a misnomer.

Consider the introduction of leasing into the capital budgeting procedure. The internally generated earnings at a company's disposal could (if it was so decreed) be distributed in such a way as to finance the initial payments on a group of lease contracts which covered most of the investment opportunities it was facing. The Industrial Survey was to indicate, however, that this financing strategy is most unlikely : companies prefer to divide their available capital between the outright purchase of the majority of projects and the leasing of some of the remainder. The effect of this action is to produce a redistribution of the pool of funds which in turn results in a 'tapering-off' or 'slackening' of the capital restriction.[1] For example, £1000 of capital can be divided into, say, £800 for outright purchase acquisition and £200 for the first leasing instalments of a group of assets. The proportional split dictates how many projects can be ultimately undertaken because, quite clearly, the greater the quantity of funds allocated to leasing, the greater the number of projects

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1. See Figure 4.4 supra.

initiated.[1] Thus, the rationing constraint can be said to relax (taper-off) in accordance with the distribution of capital between leasing and buying.

Given that sufficient quantities of debt-supportive cash-flow capacity exists, then it is quite feasible that the company could completely eliminate the 'artificially conceived and erected' capital constraint by using the funds already at its discretion to buy and lease the investment opportunities open to it.

It follows, therefore, that the REAL constraint imposed on the company's ability to undertake projects is not capital, but either:

I. An elimination of debt-supportive capacity (thereby preventing further investments being funded : the real constraint); or,

2. Simply expending the list of acceptable/profitable projects because capital equilibrium has been reached.

The second major issue follows directly from this argument and is concerned with the problem of discontinuities in project appraisal.[2]

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1. It follows that the pledging of free cash-flow to debt capacity will generate a larger capital base than would be the case it if was used to fund outright purchase acquisition : £1000 spent on new assets requires and uses £1000 worth of cash; £1000 of the current year's residual cash-flow pledged to a 5 year lease contract may acquire £3000 worth or more of assets.

2. First raised by LORIE & SAVAGE[89, p231] but more frequently referred to today as "project indivisibilities": see MAO [93, p228 et. seq.] where he notes that they are "a serious problem to be reckoned with in the investment decision."

It is argued that this "problem" is rendered (almost) invalid with the introduction of leasing into the capital budgeting procedure[1]. Thus, it is potentially always possible to fund marginally accepted/rejected projects by re-allocating the 'outright-purchase' capital it would have absorbed from the budget, to the first repayment of a "tailor-made" lease contract. As MAO correctly observes, indivisibilities are a significant problem in project appraisal when the capital budget is rigidly fixed; but if leasing is introduced and the pool of funds is re-distributed, then their existence,importance and the computational difficulties they give rise to are no longer such serious issues : indeed, it is argued that they will probably not exist at all.

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1. The only exception being at the extreme margin when the debt-supportive capacity constraint may intervene to prevent an asset being leased. However, 'tailoring' and the relatively nominal quantities of funds needed to commence a leasing contract means that, in practice, a marginally accepted lease project (on the grounds of capital allocation alone) seems most improbable.

4.7 CORPORATE DEBT CAPACITY AND DEBT FINANCING STRATEGIES: AN INDUSTRIAL PERSPECTIVE[1]

Any enquiry into the rôle of leasing in corporate financing strategies can never be satisfactory undertaken unless there is a preliminary examination of how U.K. financial management perceives and uses debt. Thus, the following extract from the Industrial Survey was specifically designed to determine what attitudes dominate and influence managers when they are setting debt policies and measuring debt capacity. Hopefully, this will provide the external observer with accurate and unbiased information from a representative sample of U.K. companies. The concepts and arguments of DONALDSON [39], to which the writer personally subscribes, were used as a framework within which to structure query and discussion of debt as a whole.

I. CORPORATE DEBT CAPACITY: HOW IS IT DETERMINED?

The part played by debt within the overall financing strategy of a company, and in particular the methods management selected to determine the extent of debt they were prepared to utilise in their company's capital structure, were significant aspects of the industrial research. Apart from their familiarity with and ready acceptance of Bank overdraft, observers have commented in the past upon the reluctance of managers in some areas of U.K. industry and commerce

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1. What follows in this section of the Chapter is the group of results drawn from the field research which are concerned with debt financing. The major part of this study is discussed in Chapter 7, where all the details of the survey are to be found --- as such, the reader may care to see page before commencing this section.

to utilise debt. The conservative nature of U.K. financing policy -- or the professional prudence of the executives which have direct control over such policy -- is very apparent, as is clearly demonstrated in Figures 4.5 and 4.6. By comparison with many of our international competitors, the U.K. business community would appear to have lagged considerably behind in its employment of debt.

However, in recent years there has been a marked upward trend in U.K. gearing ratios[1] more, one suspects, as a result of an often desperate search for funds to sustain production and working capital levels, than as a conscious exploitation of the gains from financial leverage and the opportunities afforded by financial linkage. Many companies are/were being forced to use an hitherto unprecedented quantity of debt in their capital structure.[2]

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1. See Figure 4.5 and Table 3.2 in the previous Chapter.

2. This was especially true of many of the companies interviewed where the following 'evolving strategy' seemed to prevail: "What appears risky to most management is whatever exceeds anything done in the past. The stated debt policy is frequently the high water mark of successful past experience. The management will tend to adhere to this limit until events force it to consider a higher level, at which time it will cast around for industrial precedent or lender approval in order to reassure itself that risk is tolerable". DONALDSON [39, p248].

FIGURE 4.5

CORPORATE GEARING RATIOS[1]

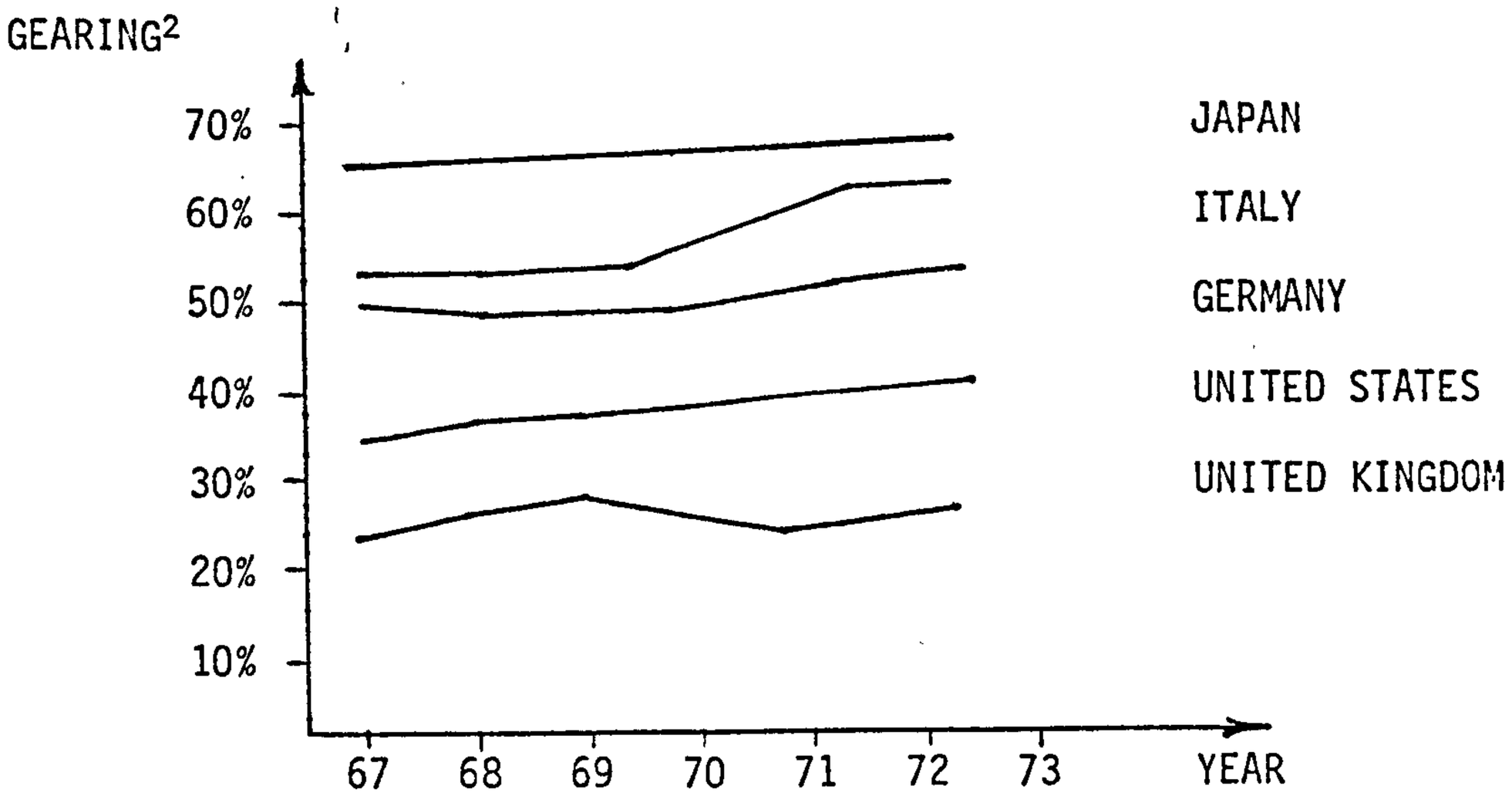

FIGURE 4.6

INCREMENTAL CORPORATE GEARING RATIO[3]

YEAR	GERMANY	FRANCE	ITALY	NETHERLANDS	U.K.
1968	0.91	0.31	0.71	0.59	0.29
1969	0.94	0.29	0.65	--	0.36
1970	0.96	0.43	0.63	--	0.41

1. Source: OECD Financial Statistics, April 1974.
2. Gearing is defined as: Capital + Reserves - Intangibles + Long Term Debt + Bank Debt (Net of Cash) = Total Capital. Debt as a percentage of total capital = gearing
3. Source: COATES & WOOLEY [36] . The Incremental Ratio = Increase in Long-term debt divided by Increase in Long-term debt + Increase in equity.
   As a precautionary note it may to be added that the comparability of these figures is often suspect because of the uniqueness of the U.K. bank overdraft system and its disclosure in the company's current liabilities and not as capital employed.

There was, needless to say, an acute awareness that an excessive and uncontrolled use of debt could be disastrous-- with current developments in the Secondary Banking Sector and the unhappy experiences of some property and leisure firms setting a daunting precedent. The clarity of this warning (the observed correlation between excessive uses of debt and corporate insolvency) had prompted many executives to reassess their debt policies to reflect the more difficult trading conditions they were then facing. To that extent the results of the field research are most valuable: the period of the study coincided with an era of reappraisal, when many of those interviewed found it increasingly crucial to relinquish historic "rule of thumb" Balance Sheet ratios and to focus attention on some criteria which reflected their circumstances. In analysing the results, therefore, it must be remembered that the economic conditions facing management had placed their debt policies and strategies in a state of flux.

The increasing willingness to accept debt by U.K. companies is mirrored in the positive intentions of a large majority of the financial executives questioned[1].

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1. In their answers some respondents would make more than one reply, whereas others would decline to answer a particular section. Hence, the aggregated answers (shown in the various boxes) will not always exactly equal the sample size of the companies studies; which was 54.

Q.1. "Judging from the reported comments of their chairman, some companies seem to plan their capital expenditures in a given period entirely out of the sum of depreciation plus retentions generated in that or a preceding trading period".

Do you tend to implement this sort of constraint?

Is it implemented	ALWAYS	USUALLY	SOMETIMES	SELDOM	NEVER
Rigorously				14	19
Firmly			2		
Flexibly		9	6		
Relaxedly					

Evidently, the restriction of capital expenditures to internally generated financial sources, which some five years ago seemed to be commonly accepted by company executives as being indicative of good financial management, is no longer the force it was. This tendency is fully confirmed in question Q.2, (see below) where capital expenditure programmes would rarely appear to be curtailed because of a deliberate reluctance to use debt to bolster funds.

The first line of debt capital supply is most evidently the Bank Manager. What is surprising, however, --- especially if a common strategy is trying to be discerned, or a trend or hypothosis established --- is the catholicity of the second choice of debt financing.

It would appear, and indeed it was to be confirmed in subsequent conversations with those involved, that a great deal of personal preference existed: such things as ease of negotiation , familiarity, established contracts, all playing a vital part. It is also noticable that leasing

Q.2.

(i) "Would you resort to debt to finance capital expenditure?"

YES	NO
44	1

(ii) "Would you tend to use a series of short-term debt expedients, periodically 'consolidated' by a longer-term funding operation?"

YES	NO
39	3

(iii) "Which type of debt would you use?"

	FIRSTLY	AS SECOND CHOICE IF THIS WAS NOT AVAILABLE	AS A LAST RESORT
BANK OVERDRAFT	36	7	1
MERCHANT BANK LOAN	5	9	3
FORMAL DEBENTURE	3	4	8
HIRE PURCHASE	0	2	4
LEASING	4	9	7
BILL OF EXCHANGE	2	2	2
ACCEPTANCE CREDIT	1	7	5
OTHERS	0	1 (term loan)	1 (Eurodollar)

enjoys an unusual reputation: being, at one and the same time, a principal second source of finance and a "source of finance that most companies love to hate!"[1] However, as will become evident in Chapter 7, question Q11, the sample of companies revealed that lease financing was used, whatever the state of mind of the executives who authorised that use. What is more, there was a distinct trend towards an increased use of leasing by the sample during the three years prior to the field research being undertaken.

Without doubt, the principal concern which financial management must have in its use of debt is the increase in risk to the company which is inseparable from that use: the phenomenon of 'financial risk'. As was anticipated, question Q3 indicates very clearly indeed the overwhelming preponderance of opinion that there must be some constraint on the corporate use of debt. Ninety five percent of those interviewed categorically stated that there was, and ought to be, effective limits on the borrowing capability of an organisation's Board of Directors. The question is, how should that limit be set?

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1. This apparent equivocation reflects the different experience of leasing by the sample of companies. For many of them, leasing contributed many advantages to their financing strategy, although it was by no means the linch-pin of their policy. The contribution would depend upon the prevailing circumstances, as will be explained in Chapter 7. For other companies, leasing was not a part of their normal financing policy at all, although they would be prepared to consider it in extreme circumstances. (The use of leasing as a major line of defence against unexpected demand for funds is considered further in Section 4.7 II).

Q.3.

"Do you consider that there is a limit to the amount of debt a company ought to use (apart from the limits imposed by the borrowing powers of directors)?"

YES	NO
50	1

Q.4.

"Does this Limit tend, <u>in fact</u>, to be set by any or all of the following factors?"

	VERY RELEVANT	RELEVANT	IRRELEVANT
'The ratio of debt to equity in the Balance Sheet'.	35	11	2
'The prior charges cover in the P. & L. account.'	23	19	6
'The prior charges cover afforded by a cash-flow forecast of some kind.'	17	19	12
'Pushing borrowing up to the limit obtainable from all sources of lending open to the company, without regard to any special ratio or indicator.'	3	12	33

In question Q 4, the opinions of the interviewees were sought on two commonly used measures of debt capacity -- Balance Sheet gearing and Prior Charges cover.

Importance is clearly placed upon the maintenance of a "respectable"

debt-to-equity ratio in the Balance Sheet[1]: there can be little doubt that this is given a high priority by management. However, it was evident (as the subsequent interviews were to reveal) that the regard for this ratio was as much, if not more, something which was emphasised to corporate executives by their external advisers, as it was the belief or experience of the executives themselves. (Considerable attention being paid at Board Level as to how the professional advisers in the Banks and Finance Houses would react to a proposed level of debt, rather than taking the more positive step of negotiating a tranche of debt, secure in the knowledge that the total quantity of debt to be serviced was covered by a certain multiple of free cash-flow).

There were MANY occasions when the 40% Balance Sheet limit to debt financing was mentioned --- almost as a conditioned response[2]. Despite

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1. The field research indicated that this ratio was firmly based, and applied, on book values. It would appear, in the U.K. at least, that the controversy discussed by BARGES [10] between the measurement of gearing in book value or market value terms, is not an issue of extensive debate in practice.
2. It is interesting to conjecture what would have been the reply to this question had it been asked just a few years ago: 25 to 30% seems to have been adjudicated correct throughout the 1960's; see DONALDSON [39] or SYKES [127]. An American study by LEV [87] revealed a most interesting psychological phenomenon: he devised a statistical model to test "whether firms tend to adjust their financial ratios to industrial averages". From a sample of 900 companies, LEV concluded that the empirical results were consistent with this hypothesis. The respondents of the UK survey under discussion rarely questioned the validity of the 40% debt limit .... it would appear to have become established folklore in financial circles. It is equally intriguing to surmise what forces (both economic and psychological) are at work in the various countries listed in Figure 4.4 . The research by COATES & WOOLEY came to no positive conclusion about which of a list of economic factors (issue costs, taxation levels, rates of inflation, peculiarities of the national capital markets) influenced or stimulated the wide disparity in the use of debt throughout Europe. Preliminary evidence obtained in an empirical research study of Belgium and the Netherlands (conducted by the writer in 1975/1976) into the use of instalment debt, suggests that: as in the U.K., the psychological security of adopting financing postures which accord with the slowly evolving traditions of the community within which the company operates, is on balance probably as important, if not more so, than the economic parameters studied by COATES & WOOLEY.

this tendency towards an acknowledged group norm, no respondent could furnish a satisfactory explanation why 40% was the optimal "magic figure". As DONALDSON notes:

> "One of the dangers of a fixed single standard is that it gives an unwarrented impression of absoluteness. At times such standards appear to be employed as if debt up to some predetermined level involves no risk, but debt beyond that level produces a sharp and unacceptable increase in risk".
>
> DONALDSON [39 ,p146]

A number of financial executives did express significant scepticism as to the validity of a rigid debt-to-equity standard of debt capacity; and indeed many of the companies were experimenting with larger quantities of debt as a permanent addition to their capital structure. These companies may be broadly catagorised into three types. Firstly, the sample contained a limited number of, invariably large, companies with well organised finance functions, who devoted a considerable amount of time and resources to the question of what constituted an appropriate debt level. When negotiating new debt contracts it was normal commercial practice to volunteer a detailed cash-flow projection for the asset in question and, if requested, for the company as a whole. Their assessment of debt capacity was analogous to the previously discussed "debt supportive capacity of free cash-flows"; and although this estimation would vary in sophistication between the various companies, it was a common practice to programme the problem in the form of a

financial model[1].

The second group of companies were becoming increasingly dissatisfied with the mechanistic application of Balance Sheet gearing ratios. The preponderance of this sample may be detected by the number of respondents who found either, or both, of the two cover ratios to be "very relevant" or "relevant". Some 65 to 75% of those who replied indicated that one of the cover ratios was slowly beginning to take precedence in setting their debt capacity standard. Prima facie, this trend is encouraging. However, the answers to question, Q4, must be treated with considerable circumspection.

In clarifying their opinions on the use of a Prior Charges cover, derived from the Profit and Loss account, most executives readily accepted that such information was of only limited value -- being but a poor surrogate for a true cash-flow Prior Charges cover. A similar response was forthcoming from those companies who defined cash-flow as 'retained earning plus depreciation charged in that year'.

For the 17 companies who replied that they considered a cover ratio based upon a forecast of cash-flow to be "very relevant", many were to subsequently suggest that this answer was based more on positive intention, rather than on an actual practice which was fully operational. They were giving a high priority to developing the necessary techniques, restructuring their management and financial accounting data systems, experimenting with computer packages etc., but as yet their experience was limited.

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1. Invariably this would be of the 'simulation-type' of model: thereby enabling management to simulate various potential problems --- asking "what would happen to the level of cash-flow if ....?" type of questions. This approach differs from the 'optimisation-type' of model to be discussed in Chapter 5.

The final group of companies (which occasionally encompassed some firms in the previous category) revealed that their capacity to absorb further tranches of debt was not (as the researcher would have preferred) a result of their ability to support higher levels of debt servicing costs out of improving quantities of free cash-flow, but was more, they implied, a function of some special merit in the eyes of their financial advisers. Their new debt level would still be set by traditional Balance Sheet ratios, although they would be allowed to reach a higher value.

Generalising on the results of question, Q4, it was clear that several of the executives were inconsistent between their opinions and the implementation of those opinions. Despite scoring the highest number of replies, the widespread use and acceptance of gearing ratios as a measure of debt capacity is evidently slowly on the wane. The disparity which existed in the sample between the dogged application of well-worn debt-to-equity ratios and the widely acknowledged importance of liquidity coverage and accurate cash-flow data, reflects the period of change captured in the study. For, in the final analysis, all that a Balance Sheet ratio can be is some readily accessible crude proxy for a more rigorous examination of the debt-servicing adequacy of corporate cash-flow.

The crudeness of this proxy is revealed in question, Q5, where there appears to be no clear outstanding reason why a given debt-to equity ratio is or is not acceptable. Grouping the "very relevant" and "relevant" categories together it is observed that: in (i), just over 50% thought it was in some measure set by "an acceptable ratio for U.K. industry at large" (but 40% thought this to be irrelevant); in (ii),

Q.5:

"If you consider that the DEBT/EQUITY ratio in the Balance Sheet is at least 'RELEVANT': is the standard for that ratio set by any or all of the following":

	VERY RELEVANT	RELEVANT	IRRELEVANT
(i) "An acceptable ratio for U.K. industry at large"	9	17	21
(ii) "An acceptable ratio for companies in your industry"	16	14	17
(iii) "An acceptable ratio for companies of your size"	13	17	16
(iv) "An acceptable ratio for your company because:-			
(a) It will minimise the over-all cost of finance	21	15	11
(b) It will be acceptable to your shareholders	18	22	8
(c) It does not seem too risky to management in terms of company survival	16	17	14
(d) It does not seem too risky to management in terms of 'flexibility' or 'future' room to manoeuvre'.	20	16	10
(v) "An acceptable ratio as specified by your Merchant Bank or other financial adviser".	12	18	17

some 55% felt that the appropriate ratio was a function of the industry or similar organisations (but 30%thought this to be quite irrelevant); in (iii) nearly 60% of the respondents thought it had something to do with the size or relative importance of the company (but, again, 30% thought this was irrelevant). Apparently, a great deal of confusion predominates managerial thinking in the above three issues.

However, the intentions of the respondents were quite consistent in section (iv) -- indicating the seriousness with which management regards the reactions of their shareholders: significantly, section (iv: b) received the fewest "irrelevant" replies. The vast majority of the sample, 75%, showed concern that their debt policy must be acceptable to their equity-holders or adverse reaction would follow (either directly, through the sale of their shares, or via the return they would demand on their investment -- the cost of equity finance).

Sections (iv: c & d) are of particular interest. It is likely that managerial concern in terms of "future room to manoeuvre" which figured fairly prominently in the replies, really relates to "future room to manoeuvre in raising additional finance" --- which again has strong connotations with shareholder reactions. Yet, not one respondent was able to point to any clear example or evidence of shareholder concern with Balance Sheet ratios: there prevailed an almost universal uncertainty as to the rôle or wishes of shareholders in setting debt policy. Indeed, several respondents felt that their shareholding was made up of so mixed a group of people that it would be quite impossible to establish a common "shareholder posture" so far as concerned the capital structure of their organisation. The only construction that can be placed on this ambivalent attitude (if indeed it is an explanation)

involves a circularity. The shareholder grants an in absentia authority to his professional adviser to inform him of the risks inherent in a company's financial mix. The professional adviser (who may be a Stock Broker or Merchant Banker) uses market stereotypes of acceptable debt-to-equity ratios, rather than rigorous enquiry into the debt servicing adequacy of corporate cash-flow. If the debt ratio exceeds certain historical standards then there are instructions to sell. The professional adviser -- now acting in his other capacity as industrial financier -- informs the company of how their shareholding body would react to changes in the capital structure. The company is relucant to raise further debt because of the possible reactions of the shareholders when, unwittingly, it is the existence of an uncompromising professional opinion as the intermediary which is the real constraint.

One final point may be raised concerning the possible misinterpretation of the results in section (v). Some 30 companies, out of the 54 questioned, stated that they relied on the debt capacity standards of a lending institution. Prima facie, this would appear to be evidence of a large scale abdication of responsibility on behalf of the executives involved (similar to that observed by DONALDSON in his study and represented by the uncritical adoption of the traditional Balance Sheet standards of debt capacity previously discussed)[1].

However, the replies embodied two distinct attitudes on the part of the Banks, and their customers, as to what constitutes an appropriate

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1. "Few corporate officials would be flattered by the assertion that such a critical element of debt policy as the limits of debt capacity was not an independent decision but rather was based on an uncritical acceptance of other people's opinions or actions. Nevertheless, the observations so far on the source of operating standards of debt capacity suggest that this is substantially true in a number of instances". DONALDSON [39 ,p118].

debt level. The first of these accords with the acquiescent nature of some companies to the recommendations of their Bank.

The second, and increasingly more prominent attitude, concerns the positive steps being taken by Banks to guide and assist their clients in the task of preparing cash-flow forecasts ..... from which debt bearing standards can be derived. On balance, the research indicated

> a slow turning towards the use of cash-flow projections, generally as an important managerial instrument of financial planning and control, although the time of the Survey such a trend was in its adolescence, if not infancy[1]. Thus the reliance of many executives upon the

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1. The state of flux in debt policy disclosed throughout the field research offers an interesting comparison of attitudes to those now being pursued by the Banks. A number of respondents expressed firm opposition to revealing cash-flow projectiors, feeling that such "delicate" information should be restricted to the Board. As one finance director remarked: "I don't think in a big and financially sound company like ours that the Banks have the option to ask for such information. Your projected cash-flows are your own affair and to offer them up like that is not on, unless you are driven to it. I have not seen any evidence of the Banks seeing anything of ours projected into the future".
However, several executives openly censured the Banks for their continued rejection, or more accurately distrust, of cash-flow projections: believing them to be remiss in not employing this vital data as a more meaningful debt-capacity indicator during financing discussions. As one treasurer remarked: "I think that cash-flow is something that financial analysts have got to get their teeth into, certainly in this country. In prospectuses for debentures it is not unusual to see a cash-flow statement showing how these funds are to be flowing and hence how they can service the debt. I think it is absolutely crucial to the lending of money. When I deal with Banks they do not expect me to produce too much in the way of forecasts in this area. I think they could smarten up quite a lot here".
Since this study was undertaken a number of discussions with senior executives in the larger joint stock Banks indicate that the present squeeze on corporate liquidity has produced a rapidly increasing use of cash-flow projections as a major verification instrument on application for overdraft facilities -- often at the Banks request.

external advice of the Banks and Finance Houses is indicative of the reciprocal benefits both will obtain from more detailed quantification of cash-flow data. Such an action should not be misconstrued as an 'abdication of responsibility', but as one part of the learning process towards a constructive instigation of a more rigorous analysis -- which in the end will achieve the common objective of a realistic debt level.

However, one of the obstacles to change is the suspicion by both parties that forecastes can not be fully relied upon either because the future state of the economy and government policy are too unpredictable, or because managers and bankers continue to dislike any but the simplest of forecasting techniques.

If the Balance Sheet ratio continues to be regarded as a primary determinant of the amount of debt which an organisation can safely use, it becomes important to know what is generally considered to constitute "debt". Question, Q6, is instructive in this respect:

Q. 6.

"In thinking about DEBT/EQUITY ratios would you include":

	YES	NO
OVERDRAFT	45	5
HIRE PURCHASE	19	30
LEASING	13	35
BILL OF EXCHANGE	25	24

It would appear that in very many of the companies questioned, instalment debt would not be included in arriving at a figure for debt. (Indirect support for this attitude is given by the fact that very few of the auditors whom the researcher has questioned over the past few years regard leasing, especially, as falling within the limitations on Director's borrowing powers as set out in the Articles of Association of a company). In fact, this question reveals an inconsistency which typifies this area of research. In discussing their answers, few if any respondents professed themselves to be influenced by the argument that leasing is "Off Balance-Sheet finance", thereby not affecting borrowing capacity yet improving the apparent return on capital employed[1]. The non-inclusion of instalment debt when computing debt-equity ratios appears, therefore, to be an act of inadvertent omission rather than deliberate commission. Yet, when asked[2] why they thought leasing continues to grow as a method of finance (despite the fact that the same respondents had already replied that they thought it an expensive form

1. See Question QL18, in Chapter 7
2. See Question QL20, in Chapter 7

of finance) a very typical reply was of the kind: "it leaves conventional credit lines clear"; "it relieves a shortage of borrowing power"; or "it meets a desire to have a better (less debt ridden?) Balance Sheet". Evidently, the "Off Balance Sheet finance" attribute of instalment debt is "O.K. for the other company", but smacks too much of questionable financial practice to claim it for oneself.

These issues will be reconsidered in more detail during Chapter 7.

II A STRATEGY OF FINANCIAL MOBILITY

One important aspect of corporate debt policy thus far not considered, concerns the character and composition of the group of debt instruments which an organisation may have previously negotiated, but which currently remain dormant. These "concealed" resources, and their implementation, represent what DONALDSON [40] has termed a "Strategy of Financial Mobility".

This concept is based upon the argument that an organisation is heir to all sorts of unexpected opportunities and perils[1]. It is, therefore, the responsibility of financial management to devise a programme outlining the various sources of emergency reserves of funds and how much of these funds should be drawn in different circumstances. In "normal" times, these reserves will remain untouched. DONALDSON's empirical study indicated that the typical contingency programme of recourse to such reserves is: (i) agreed overdraft facilities, (ii) a planned sequence of cut-backs on operating expenses, (iii) a planned pressure on trade

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1. Sudden strikes, economic recession or boom, equipment or plant failure, unanticipated market openings etc., all being typical examples.

credit and liquidation of short-term assets such as stocks, (iv) predetermined, and at least partially prenegotiated, recourse to medium and long-term debt (supplemented by special techniques such as sale and lease back: and having as part of the objective of this exercise the refunding of short-term debt, such as bank overdraft, in order that these sources may once more be available), (v) a programme of potential disinvestment in the long term assets of the company, such as selling-off subsidiaries, (vi) a continuing discourse with professional advisers on the possibility of issuing equity so that, if need be, this "last resort" finance could be readily brought into use.

As DONALDSON notes there will be financial variations in the programme according to whether the situation is one of unexpected peril or unexpected opportunity. Nevertheless, the enactment of the strategy is similar in both cases: financial management has a duty to organise emergency lines of credit and keep them up-dated so that they may be exploited at short notice when the time comes. Equally, (but perhaps a more difficult task), it is also necessary to evaluate the cost of having a "strategic reserve of financial capability", and to compare that cost with the corresponding benefits.

Thus, the Industrial Survey attempted to determine whether U.K. companies had premeditated policies of financial mobility and whether (in view of the topic of this Thesis) they included instalment debt[1].

There were several questions in the field research which were relevant

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1. The attributes of leasing that it is flexible, available almost instantly, and is an impermanent addition to the capital structure, would seem to make it a highly attractive component of such a strategy -- whether in unexpected peril or opportunity.

to a strategy of financial mobility[1]: question, Q2 (ii) indicated that a vast majority of respondents would periodically consolidate a series of short-term debt expedients by a longer term funding operation (this readjustment of the capital structure being necessary to regain short-term flexibility in, say, bank overdraft or short period loan facilities[2]); question, Q2 (iii) signified the great variety of debt instruments which would be called upon as a second choice of debt and an equally wide variety of preference for last resort financing (a demonstration of the almost infinite combination of funding sources that are used in practice to assist in the process of financial mobility); question, Q5 (iv:d), evinces the concern management have for flexibility in their capital structure and the conscious wish not to constrain future manoeuvrability by over-committing certain resources now, which would be more valuable to the company at a later period. Finally, questions Q7 and Q8, were concerned with quantifying the extent of the debt cushion management felt was desirable to have on call[3].

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1. Note: as the companies in the Survey were all 'financially sound', the interviewer did not have the opportunity to discuss the later, more drastic, stages of mobility concerned with strategies to cope with very serious problems or imminent insolvency. Thus what follows (and particularly Figure 4.7 infra) represents an industrial strategy of mobility in difficult but not severe conditions.
2. As one executive replied: "It is necessary to retain some flexibility as some of the planned expenditure will not be made, and opportunities may arise which require additional cash expenditure. This flexibility is normally achieved by having surplus short-term borrowing facilities, which for us includes leasing".
3. Regretfully, the Survey did not include a question on the composition of the debt cushion. Conscious of this omission, the matter was pursued in more depth at the subsequent interviews.

0.7.

"Has your company negotiated a debt cushion: the difference between the amount of debt presently in use and the amount that is available on call if deemed necessary?"

YES	NO
29	3

0.8.

"Could you place an approximate figure, nearest 10%, on the extra credit available on immediate call over that in current use?"

	PERCENTAGE CREDIT AVAILABLE				
	0-20%	20-40%	40-60%	60-80%	80%+
Number of companies	5	10	5	3	4

There was conspicuous evidence both in the questionnaire results and the conversations which followed, that the prevailing economic problems had compelled many of the companies to marshal their resources of mobility. With varying degrees of definitiveness[1], their policies and strategies would include an assesment of the probable magnitude of each financial resource, the likelyhood of its attainment, and some imprecise ranking of the order in which they would be used.

1. The strategy was rarely as clearly rationalised, articulated or implemented as DONALDSON's exemplar model; but there can be little doubt of its existence and increasing relevance in practice.

Q.9.

"In planning your investment strategy or financing strategy which of the following estimates would you use?"

	Replies
most likely	34
worst possible	15
most optimistic	5

Q.10.

"If you do, in fact, consider more than one type of estimate, is this complemented by more than one strategy or plan which could be called upon as events change?"

YES	NO
23	12

An attempt has been made in Figure 4.7 to generalise, into one diagram, the typical 'image' which U.K. management possesses when they are discussing financial mobility. It must be stressed that the construction of this illustration is built upon the PERCEPTIONS of management --- which may differ markedly from the actual events which follow the instigation of a given strategy. It should be possible to establish an individual profile for each of the companies studied, with correspondingly more or less debt alternatives, different cost schedules, various current capital mixes etc.[1]. Each financial mix will be unique: the debt portfolio will be a complex, interwoven structure designed to meet a multitude of objectives.

Each company will have a balance of resources which are capable of withstanding unexpected events to a greater or lesser degree, depending upon how the debt mix restricts future manoeuvrability. This is generally a function of the level of exploitation of each pocket of debt (the simplest example being the overdraft ceiling : if it is fully committed it will leave the company dangerously exposed to any sudden demand for cash). Similar arguments are presumed to apply to other sources of funds[2], with the experienced treasurer perceiving where the 'limits' of the various debt instruments will be and how their cost

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1. As such, the abstraction carries no special merit as a strategy of financial mobility, although it is felt to represent the most frequently met policy in the larger companies of the sample. (Smaller companies would have to rely very heavily on their overdraft facility, perhaps complemented by, say, a leasing policy).
2. "..... there is no clearly defined relationship among debt contracts of different maturities and institutional connections. The normal tendency is to treat commercial bank debt as one pocket and term debt with insurance companies as another pocket. Each has its defined capacity, which appears unrelated to use of the other". DONALDSON [40 ,p214] emphasis supplied.

structure will (approximately) vary if the current debt mix is changed. No apology is made for the inexactness of this statement because it depends upon abstract qualities of feel and perception rather than quantifiable measurement -- it is an inevitable consequence of the uncertainty surrounding the topic.

Thus, given a determined effort by management, the composition and shape of the various parameters shown in Figure 4.7 can be established. The diagram comprises of the following groups of information:

1. A list of each financial source being used by the company together with a presumed cost schedule (which may be conjecture or based upon information from the Finance Houses involved) of how the cost of a particular debt instrument will alter the more it is used.
2. A debt 'envelope' representing the current financial mix -- this shows how much of each debt source is currently being used and how much it costs.
3. An assumed maximum limit on each capital source[1]. Note that the cost curve is asymptotic with the vertical axis at this point im-

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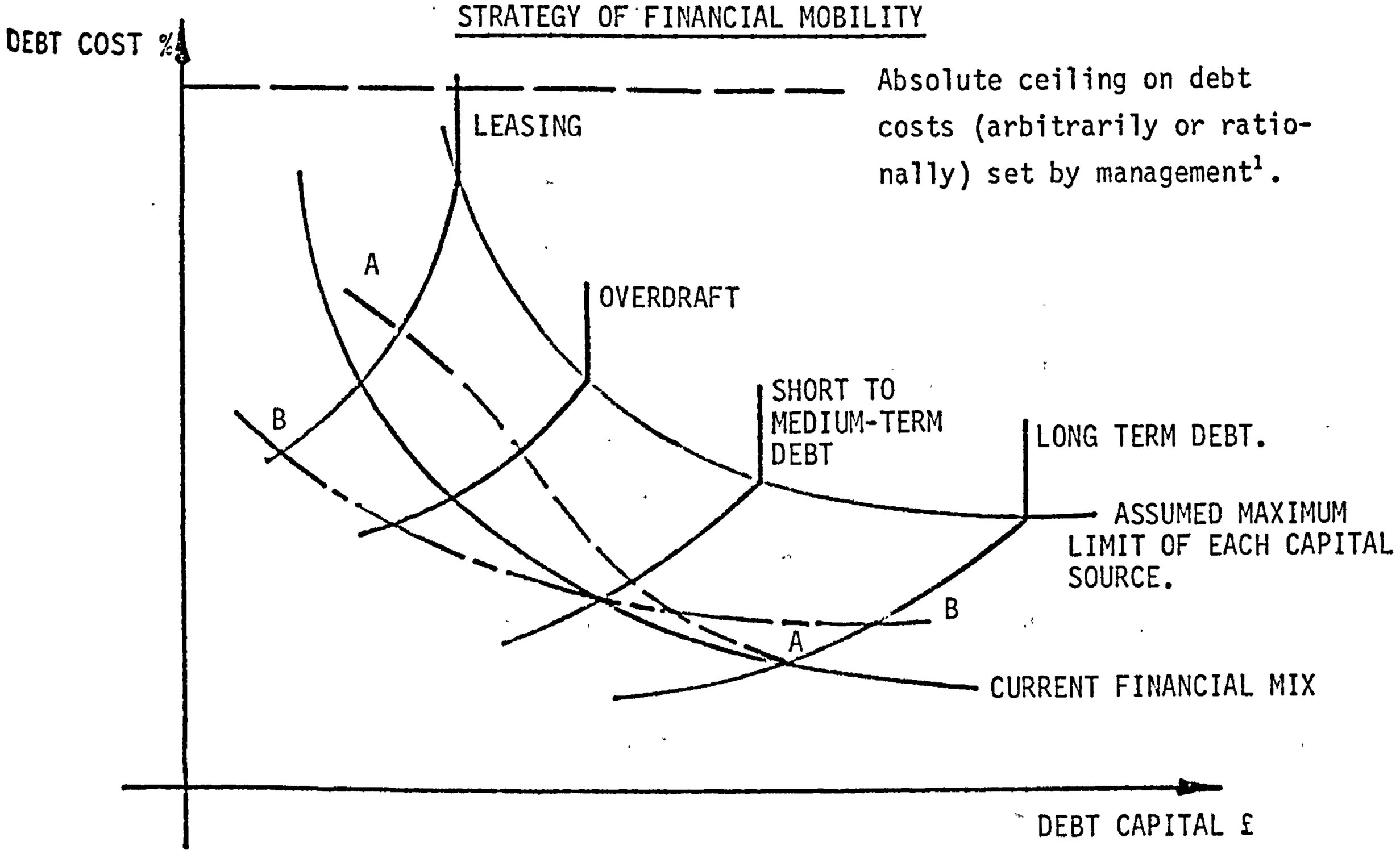
1. This is very much a behavioural response by management (see also the footnote below Figure 4.7). There exists quite distinct, and easily discernable, limits to the price and type of debt that financial executives find acceptable (industrial hire-purchase and, to a lesser extent, leasing being spurned by some of the respondents because they would find it personally embarrassing to be seen using it: see Chapter 7). Viewed in a wider perspective, strong motives exist to reject debt if it is thought (by others) to be too costly -- a loss of professional status would appear to result from a reduced credit rating -- or if the debt source is accompanied by what may seem to be excessively restrictive conditions. As DONALDSON notes [40 ,p203]: "Financial resources for any given company over any normal planning horizon are finite; they can be exhausted. The standard argument that funds are always available" at a price" ignores the fact that there are distinct limits to the price that can and will be paid". The evidence of the UK Survey certainly confirms DONALSON's opinion.

plying (notionally) that management believes that no more funds will be forthcoming at any price.

4. An absolute ceiling on the price of funds that an executive is prepared to pay.

FIGURE 4.7

STRATEGY OF FINANCIAL MOBILITY



A-A = Resource disposition during initial stages of a strategy of financial mobility: note the impermanent nature of the debt instruments involved.

B-B = Restructuring of the capital mix and a consolidation of short-term debts.

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1. The existence of some 'cost-barrier' beyond which management was not prepared to consider a financial source was very evident in the survey -- for example, one executive had recently recommended to the board that at 24% the quote for a lease contract was simply too high, however he would acquiesce to the use of leasing at 20%: the limit is thereby defined. In general, executives would refuse to consider a debt instrument beyond a well defined figure, typically Bank rate plus x%.

There are three major critisisms of Figure 4.7 , all of which highlight its simplicity:

Firstly, the cost curves are continuous when it is more probable that they would be stepped to denote precise breaks, or upward shifts, in the cost of a debt source as more is consumed (although where these will occur is clearly a most difficult problem in forecasting).

Secondly, it seems reasonable to argue that as the company moves up an individual cost schedule it will gain more information about the reactions of the suppliers of capital, which will cause it to amend (i) the shape of the curve in question, (ii) the shapes of other debt sources, and (iii) the 'absolute maximum limit' of each debt instrument, either upwards or downwards. Hence the contour of each line is not an absolute statement, only a representation at an instant in time.

Finally, the shape of the cost schedule will most probably have been established as an isolated piece of data. As such, it is unlikely to reflect the interdependencies which exist between the components of the debt mix (although the executive, or the Finance House, which compiled the curve may have 'built-in' a modification in an attempt to take account of the interactivities).

These problems apart, consider now the two curves AA and BB: the two stages in a strategy of financial mobility[1]. On the basis of the interviews, a familiar pattern of events was revealed concerning the reactions

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1. Or, as one executive remarked, it was "a cycle in the process of the company's financial evolution often accelerated by temporary adversity".

of management to illequidity, unexpected demand for capital assets, and general cash inadequacy[1].

The first stage of such a strategy, as shown by the AA curve, contains four salient features:

1. The nature of the problem will probably demand swift and incisive action by management. Thus, the use of long-term debt as a major means of support is precluded because it will generally require a considerable period of time to organise and secure. If the company's understanding of the situation is sufficiently clear to recognise a longer term deficiency in the capital structure, then negotiations may commence at this stage to secure a large debenture or

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1. The reader is reminded that the generalisation to follow is a strategy of mobility in difficult but not severe conditions. The course taken by U.K. management in the early stages of an unexpected adversity show a close affinity to that expressed by the participants in DONALDSON's research study.
However, some recent empirical evidence from the USA, see ELAM [41], suggests that a different pattern of events occur (to that suggested by DONALDSON) as grave financial circumstances overtake a company. Two of ELAM's conclusions are relevant here:
"One unexpected observation was that, over the period studied, the non-bankrupt firms had a much higher rate of increase in lease commitment than the bankrupt firms. Apparently, as firms approach bankruptcy, their lease commitments decrease in relation to their total assets". [41 ,p31]
"The data indicated that as firms approach bankruptcy almost all its growing liabilities are in the form of longterm debt". [41 ,p32].
It would seem, therefore, that the BB curve accords with a 'terminal' financial posture, in that companies do not use, or are prevented from using, their short-term debt capacity. This was not intended. ELAM's statistical results, and the current field research, would appear to indicate the following (although, as a caveat, this impression would require empirical validation on a larger scale than the current survey): if 'difficult' conditions exist then ease, the company moves from the AA curve to the BB curve and possibly back to the 'current' capital mix; however, if extreme conditions occur the last course of action is precluded and if further deterioration takes place the company is forced into insolvency.

funded debt at a later period.

2. At the forefront of a strategy of mobility are short-term debt sources --- the reasons for this being that such sources are relatively easy to obtain, they are flexible, free from restraint on managerial action and, in general, reliable.

However, they are frequently at the more expensive end of the company's debt portfolio. To many observers this may seem a non-optimal policy: the cheapest sources should have been used first.

"Theory would suggest that the proper approach to the use of resources under uncertainty would be to rank these resources in order of increasing cost and use them as required, starting with the cheapest first. The problem in practice lies in the fact that cost does not in itself relate to the needs of mobility, nor does it naturally coincide with characteristics of resources that do relate to mobility".

DONALDSON [40 ,p244].

Thus, no surprise is to be occasioned that companies use relatively expensive forms of debt, such as leasing, as a key resource of mobility: its ready accessibility outweighs its explicit cost[1].

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1. To achieve a meaningful policy of financial mobility management must hold a portfolio of debt instruments. It must also be prepared to incur the cost of leaving part of a cheaper stratum of debt intact (by moving to more expensive forms of debt instead of exhausting each source of debt before moving to the next). Thus, the price paid for an individual source of debt is, in some measure, dependent upon the cushion of mobility that is demanded. If a company uses leasing at x% when it has at its disposal (as reserve capacity) less expensive short-term loan or overdraft facilities, then the incremental cost incurred has two components: (i) the rise in interest costs which reflect the increase in the lenders risk as more debt is undertaken, and (ii) the pecunary sacrifice which must be borne if the company is to attain its desired balance between those resources in use and those in reserve. The latter component (the true cost of financial mobility) is frequently neglected in discussions of debt costs. It is also a further indication of the interdependencies which exist between finance costs, and is another argument against 'discriminatory financing'.

3. An important aspect of this period of the strategy is to avoid absorbing all of the expected capacity in each pocket of debt; on the (prudent) argument that the unexpected event may become more severe than anticipated. Management will, as a result of this policy, have to move up the curve (in a north westerly direction) and begin using more expensive strata of debt.

4. When the problem abates, the AA curve may be relaxed down to the current financial mix line, or (as DONALDSON noted, see fn. 2, page 198) this new financing mix will become permanent and perhaps cause the perceived 'absolute maximum limit' curve to be raised upwards and to the right.

The second stage of the strategy, as depicted in the BB curve, is designed to achieve two interactive objectives: firstly, it consolidates the excess short-term debt facilities into a single long-term debt instrument (an action frequently demanded by the Banks); and, secondly, it simultaneously creates vital short-term facilities which can be re-exploited upto and beyond the AA curve if the problem is prolonged --- in which case each of the short-term forms of debt will be pursued to the full.

Thus, in summary, the conversations held with UK management suggest a strategy of financial mobility based upon a simple cyclical pattern: a reliance on short-term debt, leading to a consolidation of these sources which would then be re-employed upto the AA curve.

4.8 CONCLUSION

A great many issues have been covered in this Chapter which are central to the interpretation of financial theory being adopted in this Thesis. If the scope of the leasing decision is to be fully appreciated and a satisfactory analytical technique developed than it is essential that various issues and controversies be (at least partially) resolved and translated into practical decision heuristics.

Arguably, the two most important problem areas which have been discussed thus far and which impinge principally upon the leasing decision are: (I) the correct assessment of corporate debt capacity -- so that lease financing can be optimally exploited -- and (2) the need to integrate the I. & F. decisions -- so that leasing can be correctly evaluated.

Because the leasing decision demands a simultaneous anlaysis of the two decisions it is essential that financial management consider and make a thorough analysis of the various inter-relationships and interdependencies that affect the evaluation process.

The problem, however, is that while the majority of these interdependencies are of great practical significance they are often subtle, complex and frequently very difficult to model with any realism or accuracy. There exists a wide gap between the theoretical identification of an interdependency the development of a procedure to resolve it, and a practical algorithm which is a suitably accurate proxy.

This is particularly true of the hurdle rate to be applied in the leasing decision, which as previously argued is synonomous

with the hurdle rate problem in the joint I. & F. decision (more on this topic in the next Chapter). Economic theory quite correctly indicates that the marginal efficiency of capital (MEC) is the appropriate discount rate to use in a capital rationing situation. The unresolved problem, however, is that the numerical value of the MEC is only known once the optimal solution is attained. This interdependency is well documented in the literature but is does not seem to have been associated with, or applied to, the leasing decision problem.

Indeed, the argument is considerably more complex in the case of leasing: historically the discount rate problem has been enumerated using a fixed capital budget. However, with the introduction of leasing into the pool of funds the capital budget effectively begins to increase --- there is a dynamic situation in which both the weighted average cost of capital and the marginal efficiency of capital change at one and the same time. No procedure has been developed to cope with this highly complex integrated capital budgeting problem and, as such, the correct identification of the hurdle rate under 'dynamic' conditions remains unknown. By implication, therefore, the discount rate to apply in the case of leasing is also unresolved.

It has been suggested that the most suitable surrogate is the weighted average cost of capital adjusted for any anticipated changes brought about by leasing. Regrettably this is neither an accurate nor very satisfactory procedure but the nature of the interdependency precludes a totally accurate solution.

The assessment of debt capacity and the optimal quantity of debt to be employed by a company are obviously crucial to the

efficient use of leasing. Debt financing is now the principal source of new capital for U.K. industry and there is every reason to believe that this will be so for the foreseeable future. Thus, how, when, under what circumstances, and by what criteria of judgement debt is raised, becomes one of the key problems facing financial managment today.

Despite observable warnings of illiquidity and cash insolvency corporate executives still persist in their reliance upon rule of thumb balance sheet ratios, or external advice and indicators, as a measure of debt capacity . The field research has identified a small but timely and significant trend towards more realistic methods of analysis using cash-flow data as a means of establishing safe and controllable levels of debt.

It was argued that companies should measure their unique capacity to bear debt using a technique termed the 'debt supportiveness of free cash-flows'. Once the quantity of free cash-flow has been established the company can engage the 'Linkage' process in an effort to promote still further projects and generate still further cash-flow by pledging the level of free cash-flow to the repayment of Instalment Debt.

CHAPTER 5

FURTHER ISSUES OF RELEVANCE TO THE LEASING DECISION: DISCRIMINATORY FINANCING; MATHEMATICAL MODELS OF THE I & F DECISION; AND CORPORATE TAXATION.

5.I INTRODUCTION

Three major issues will be considered in this Chapter:

the first is termed 'discriminatory financing', which is concerned with the discount rate to be applied to specific investment or financing decisions; the second concerns a discussion of mathematical programming models of the integrated I & F decision; and, thirdly, the question of corporate taxation will be introduced.

It will be argued that discriminatory financing is a frequently met hazard in the leasing decision which is especially prevalent in those procedures which (implicitly or explicitly) utilised a discount rate based upon HALEY & SCHALL's "Value Additivity Principle". A series of arguments will be raised against the principle, the most important of which is, its failure to acknowledge the fundamental interrelationship which exists between the elements of the capital budgeting decision and its applicability in the real world.

Earlier discussion in this Thesis has been concerned with the integrated investment and financing decision characteristics of the leasing decision: which is thus seen as a microcosm of the reality of such an integration in corporate financial management as a whole.

The main parameters of any corporate financial planning system are the I & F decisions. Current attitudes, both in theory and (to a lesser extent) in practice, are moving towards consideration of the integrated decision and a recognition of the interdependencies which exist, with attention being increasingly given to models for this purpose. Thus, in the second part of this Chapter, one of the more prominent papers in the area of integrated decision models will be discussed. Issues raised

will be the structure of the model, its constraints, the data requirement, the model's horizon and objective function, and the manner in which integration is, or is not, achieved.

In this context the optimisation model developed by CHAMBERS is a most effective choice to focus upon because: (1) it has been succesfully applied in practice by CHAMBERS; (2) historically, it is a development upon the work of WEINGARTNER who pioneered the area of financial models; (3) the model occupies a rare place in the literature, in that, it comprises not only of the necessary mathematical equations, but also a substantial numerical example and analysed results (The investment and financial data can be of enormous assistance when reproducing the model in a personal capacity to obtain clearer understanding of its modus operandi. Experience gained with this and similar models, shows that while they may be mathematically unassailable they are frequently unexpectedly deficient on numerical application: especially in the areas of infeasibility, redundancy and unboundedness); and, finally, the CHAMBER's model affords an excellent insight into the interdependencies between the I & F decisions.

The third topic to be discussed is corporate taxation; which is of great relevance to the leasing decision. Taxation is a subject of enormous scope and complexity which, unfortunately, is often seriously neglected in the capital budgeting literature in favour of over-simplistic generalisations as to its rate and incidence. The issues raised in this section reveal yet further aspects of the complex inter-relationships which exist in project appraisal. The argument developed indicates how taxation must be fully incorporated into the investment and financial

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planning sequence if Corporate financial management is to be carried out optimally.

The outcome of this discussion will be a triple integrated model concerned with the investment, financing and taxation decisions. This model represents a new subject area which, as yet, remains largely unexplored.

A tentative framework is established within which to structure discussion and analysis of the problem.

Of necessity what follows in this Chapter must be summary in treatment and selective in approach, and -- especially in the area of taxation -- be frequently content to define a problem yet only hint at a possible solution. One outcome of this will be a number of suggestions for further research.

5.2 DISCRIMINATORY FINANCING AND THE INVESTMENT DECISION

There are two fundamental interrelated issues emanating from the problem of 'discriminatory analysis' in the capital budgeting decision:

1. There is the problem of what hurdle rate to apply to a project: should an investment be appraised at a specific discount or capitalisation rate which reflects the particular characteristics and/or market perceptions of the project (that is, the use of a discount rate which is totally individual to the asset, its cash-flow profile, or its risk attributes)? And, as an important corollary to this issue:
2. If the company were to employ a singular discount rate for each project, is it possible to ensure that this procedure does not (perhaps inadvertently) bestow an unwarranted advantage or disadvantage on any other concurrent or future I & F decision.

The former problem is a polemical issue in financial theory and will reoccur on several occasions when discussing the leasing decision[1]. The second problem is also of major importance to the study of leasing, and capital budgeting in general, as the incorrect choice and application of a hurdle rate may lead to the improper acceptance of one project at the expense of (i.e. the rejection of) another. Project selec-

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1. In Chapter 6 of the Thesis it shall be observed that previous writers on the leasing decision elect a wide variety of discount rate; many of which are argued here to be 'discriminatory'. The ensuing discussion of the Value Additivity Principle, which embodies the theoretical justification for using individual project discount rates, provides the necessary background for an argument on discriminatory hurdle rates.

tion criteria should be free from this bias, and should strive to eliminate, as fully and as reasonably as possible, any erroneous benefit or pecunary advantage accruing to the individual project: by ensuring that the design of such procedures are based upon the axiom of like-with-like equitable comparison of the alternatives. This principle applies with equal force to the choice of financing options.

I TRADITIONAL THEORY AND DISCRIMINATORY FINANCING

Later in this Chapter it will be noted that the particular method of financing an asset will determine the type and size of Capital Allowances, and other taxation cash-flows, which will enure to an investment decision. These taxation amounts will clearly have a significant effect on the outcome of the project's appraisal.

The interaction of taxation flows and the possible acceptance of the project, carries with it the significant risk that an investment decision may be found to be acceptable purely because of the advantage it enjoys in its method of financing. It is a cardinal tenet of 'modern-traditional' financial theory that capital expenditure appraisal should not allow this to occur[1]. The argument being that projects do not exist independently, but as part of the "pool" of projects that are to be jointly financed by a "pool" of corporate funds.

The cost which an organisation has to pay for one form of capital is, to a significant extent, conditioned by the use which the organisa-

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1. See MERRET & SYKES [98], VAN HORNE [138] or WESTON & BRIGHAM [144].

tion is making, or proposing to make, of other forms of capital[1].

It is argued here that a company's present financial mix strongly influences how its future capital structure can develop.

It would follow, therefore, that the preferential financing which might be brought into an integrated investment and financing decision in respect of a particular proposed capital expenditure (say, a relatively cheap tranche of debt), would only be so preferential because the suppliers of that particular finance were impressed by the remainder of the capital structure of the organisation. To give the proposal under review the benefit of that preferential finance would be, in effect, to grant a subsidy (or penalty[2]) to the proposal from all other proposals.

This would be termed 'discriminatory financing': the favourable discrimination taking the form of an advantageous, artificially low, interest rate[3] which will be used to appraise the project.

The argument supported in this Thesis would therefore assert that no

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1. For example, what is perhaps considered 'cheap' debt is only forthcoming at a favourable rate because collateral exists in the form of an equity base, and the acknowledged seniority of debt in the event of insolvency. Thus, debt may be said to be 'raised on the back' of equity. The interdependency between capital sources is readily apparent when new debt is sought: a higher premium will be demanded on a new tranche of debt if the proposed capital mix endangers the risk and security of existing creditors and shareholders (who may react by also demanding a premium).
2. The alternative argument to 'cheap' debt is, of course, 'expensive' equity. Consider those projects which are financed with retained earnings: it is not normal capital budgeting policy to consider these projects as if they were 100% Equity financed; nor are they penalised by a disadvantageous appraisal rate based soley on the (expensive) cost of equity.
3. In the case of leasing this may well be the debt-rate of the company (as opposed to the IRR of the lease contract). This distinction is made here in advance of the debate in the leasing literature in Chapter 6.

spurious[1] pecunary advantage must accrue to an investment project which fortuitously happens to be associated with a cheap source of (debt) funds. Expressed another way, this implies that the allocation of marginally raised sources of capital to specific projects should be treated with the utmost care: so that the funds become indistinguishable in the 'pool' of corporate finance and, as such, investments are funded in a non-asset specific[2] manner. It would follow from this (and the earlier argument on the correct hurdle rate for integrated I & F decisions) that the appraisal rate for all projects must be uniform and based upon the weighted average cost of (or marginal efficiency of) capital ..... thereby ensuring that the profitability of a new project will satisfy all the financial participants of the company and not merely the latest marginal source.

Exactly how the argument against discriminatory financing can be incorporated into the leasing decision will be left until later Chapters on the evaluation of lease contracts. Suffice it to say here, that the proposed method involves the 'stripping-out' of the interest element inherent within the leasing repayments.

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1. Note the word spurious. Later in the Thesis the concept of RESIDUAL CAPITAL BALANCES will be introduced which will be applied to the individual integrated I & F decision. Defence of this statement is left until later.
2. A justifiable case can be made for the use of discriminatory financing in conditions of extremely independent projects (i.e. isolated by virtue of, say, geographical location -- overseas, for example -- or large, unrelated, and self-sustaining investments such as mineral extraction). However, under normal business conditions such discrimination is argued to be incorrect.

II THE VALUE ADDITIVITY PRINCIPLE

The Value Additivity Principle (henceforth VAP) runs contrary to the above 'traditional' approach to capital budgeting, in that the principle states that projects may be considered as entirely independent entities capable of being analysed in isolation.

The origin of (what has been refered to here as) 'discriminatory financing' is to be found in the works of MODIGLIANI & MILLER (particularly their 'correction' article [101]). They argued that a company's cash-flow stream could be successfully divided into its component parts, debt and equity elements, each of which could then be discounted/capatilised at the appraisal rate appropriate to the stream in isolation.

In a later paper by MOSIN [102] an asset valuation model, not too disimilar from the original MM argument[1], was developed which stated that the market value of a set of income streams was equal to the aggregate of the value of each individual stream.

Pursuing this model, SCHALL [119] and subsequently HALEY & SCHALL [68], developed MOSIN's concept into the more general Value Additively Principle. The VAP states that:

> "The total value of a set of cash-flow streams received by investors is unaltered regardless of how that set of streams is combined or divided into debt or equity streams of one or more firms".
>
> .....HALEY & SCHALL [68 ,p211]

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1. The major difference being a change of emphasis from MM's discounting the debt servicing costs and residual equity earnings at their respective rates in order to value the company, to an analysis of how perfect capital markets would value the income independently and then as part of a "set of income streams". Perfect information, arbitrage and competition ensuring that the streams had identical value under both contions.

The importance of this property of income streams is far reaching: for the ability to divide the ultimately aggregated corporate income into segments without losing any market value implies that the stream from an individual investment project can exist and be analysed as a totally independent entity[1].

If the VAP holds, then it is feasible to segregate an investment opportunity from the group of projects to which it belongs and appraise it purely as an income stream on offer to the market --- hence, a single project has no influence upon, nor is affected by, any other project or group of projects that comprise the firm[2].

Hence, using the VAP a project should be appraised as follows:

> "The value of the incremental stream X_n (emanating from the investment project in period n) to the investing firm, is equal to the value that X_n would have if it were available as an individual stream in the market".
>
> SCHALL [119 ,p20]

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1. See HALEY & SCHALL [68 ,p268]
2. Project independence is, of course, a convenient assumption in the traditional approach to investment appraisal in non-rationing conditions -- with the proviso that the results of the aggregate decision may still exert an influence upon the yields of the various capital instruments employed by the company and hence upon the hurdle rate. Thus, a cyclical interdependency clearly exists even though it is ignored when projects are considered independently. (In capital rationing conditions, individual project appraisal is non-optimal and project sets must be considered). By contrast the VAP asserts that the project must be evaluated solely by the discount rate that the market would apply to the stream in isolation. No link exists between the project and the firm for purposes of investment appraisal because the investor can divide and freely trade the corporate income stream in any combination of segments without loss of market value. See SCHALL [119 ,p20].

This may be expressed in two ways: if the investment yields X_n in perpetuity then the change in value to the company brought about by its acceptance (ΔV_t) is:

$$\Delta V_t = \sum_{t=o}^{\infty} \frac{X_n}{(1 + k_n)^t}$$: SCHALL [119 ,p21,fn17]

where k_n is the appropriate hurdle rate for the project (for that income stream); alternatively the change in the value of the firm (using MM's model) may be expressed as the value of the unlevered stream plus the value of the tax rate times the market value of debt associated with the stream (the level of debt implicit in the initial cost of the investment). Using HALEY & SCHALL's notation, a project is acceptable if;

$$V_{zu} + t.B_z - I_{zo} \geq o$$ [68 ,p284]

where V_{zu} = Value of the unlevered stream from project z in the market

$t.B_z$ = After tax value of debt used to support project z.

I_{zo} = Net investment in project z at time zero

t = Tax Rate

Which in a discounting model becomes: [68 ,p285]

$$\sum_{t=1}^{\infty} \frac{(1-t)\bar{X}_{zt} - I_{zt} + t.\overline{DP}_{zt}}{(1 + k_{zu})^t} + t.\sum_{t=1}^{\infty} \frac{\bar{R}_{zt}}{(1 + k_{zb})^t} - I_{zo} > o$$

where $\bar{X}_{zt}$ = level, perpetual, cash-flow stream from project z.

I_{zt} = further investment in project z at time t.

$\overline{DP}_{zt}$ = Tax depreciation associated with project z.

$\overline{R}_{zt}$ = Perpetual interest rate cost of debt B raised as part of project z (note: B is never retired).

k_{zu} = Discount rate applied by the market to the unlevered stream.

k_{zb} = Discount rate applied by the market to the debt stream.

The similarity of the VAP project selection procedure to MM's tax correction model is now apparent: the VAP analysis implies that a project's value will be maximised if it is financed entirely with debt (tB_z rises as the proportion of debt rises). Hence, following MM's precedent, HALEY & SCHALL are obliged to impose an artifical limit on debt financing:

> "Some imperfection is assumed here that favours a limit (on the proportion of debt used), this imperfection is not binding upon the projects themselves but on some other factor making borrowing beyond some point undesirable"
>
> HALEY & SCHALL [68 ,p285]

It is argued here that the VAP is less than satisfactory on this very important issue -- for in this approach, the value ascribed to a project is directly influenced by, and hence dependent upon, the level of debt capital raised to support the project. By implication, therefore, a company's management should strive to optimise this debt level in order that it may gain maximum advantage from its investment opportunities. But unfortunately a sound, rational, solution to the problem of what is the appropriate debt-equity mix to employ is far from apparent

(and is certainly not intrinsically solved in the VAP). HALEY & SCHALL are forced into an equivocation, outside their theoretical underpinning of the VAP argument.

They suggest that, in practice, management should adopt the following procedure: if company A is about to embark upon an investment in a process or industry it has no experience of, then it must search for a company, B, which is already established in this field. The amount of debt then applied to support the asset should reflect:

> "The optimal financing policy of the firms in the industry it is planning to enter".
>
> HALEY & SCHALL [68 ,p337]

Thus, the writers argue that the company's current financial structure under such circumstances is irrelevant[1] to the decision, because (presumably) the demand for the 'type' (i.e. a specific risk/return income stream) of funds required to support Company A's project will be in competition in the market with the 'optimal' capital mix and demand schedule for funds from Company B which will also be seeking debt for its projects. Hence, Company A must adopt Company B's capital mix policy to compete effectively in the market place.

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1. The current debt-equity relationship of the company's financial structure reflects the market perceptions of the income generating characteristics of the incumbent investments. HALEY & SCHALL are implicity arguing that all companies', capital structures are optimal: for Company A has an optimal structure when viewed from Company B and vice-versa. This argument is rejected in favour of DONALDSON's who states that: "This line of thinking merely enlarges the group that is relying on someone else to make an independent and rational decision which they can safely adopt as their own". [39 ,p128]. See also the following footnote in this section.

The statement that Company B is truly "optimally financed" is very much taken on trust rather than objective reasoning --- it is HALEY & SCHALL's belief [68 ,p5 & p330] that capital markets are "sufficiently perfect" for such 'optimality' to occur through market forces[1].

If the VAP is to be successfully applied in practice then perfect capital markets must exist to support the principle and its implications. This gives rise to two important issues implicit within the VAP which are at variance with the arguments being developed in this Thesis.

1. In the capital budgeting decision using the VAP analysis, projects are evaluated individually with the financing decision being con-

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1. In the previous Chapter reservation was expressed that markets were this perfect --- on the contrary, it was concluded that historical precedent (and the security implicit in adopting accepted conventions) is frequently, and often unthinkingly, granted the appelation 'optimal'. The empirical research indicated that, in the minds of many senior executives interviewed, the concept of an 'optimal' capital structure was imprecisely formed .... their current financial structure was frequently considered "satisfactory": being an inheritance from previous executives who experienced little problem with it; but they felt it difficult to defend as being optimal. Bankers and other representatives of the capital market were equally unsure -- often ("blindly") applying Balance Sheet ratios to guage optimality despite the agreed consensus when probed more deeply that such "accounting evidence" lacked conformity or standardisation.
Empirical research, of a statistical nature, designed to test the efficiency of the capital market (see FAMA [44] for a review of the evidence) attempts to determine whether security prices "fully reflect" all the available information -- the agreed test of efficiency. FAMA concludes that on balance the more complex tests tend to indicate that they do. However, two discussions of the paper by SHARPE [123] and SCHWARTZ [121], consider the evidence to be unclear and occasionally contradictory. They note the acknowledged problems associated with such research (from the specification of a standard measure of the riskless rate or market index, to detailed statistical argument on what are appropriate confidence limits, the virtues and disadvantages of autoregressive testing and filter analyses etc. etc.) and suggest that -- yet further -- empirical studies be undertaken to adjudicate the issue.

ducted separately from the associated investment decision.

2. However, in the VAP, the level of debt implicit in any accepted project is not determined by reference to other projects which comprise the accepted set of investments [68,p285]. Thus, the demand for funds (the relevant debt-equity mix to be raised) is conducted on a project by project basis, with the amounts raised being dependent purely upon the characteristics of the project itself[1].

The VAP also assumes that an incremental tranche of funds will be raised for each new project: the requirement for new debt and equity arises because it is assumed that all the previous project's cash-flows are dispersed from the company as either debt servicing costs or dividends -- in that way the VAP is able to evaluate the return-in-perpetuity on the debt instrument and calculate the increase in value of the equity on the assumption that shareholders receive all the unlevered income. The problem still remains, however, of establishing the optimal amount of debt to raise for a new project[2].

The two alternatives proposed by HALEY and SCHALL do not necessarily produce the same result [68, p315] and management is free to choose

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1. There is, however, some confusion on the point of which decision should be conducted first: in perfect capital markets [68 ,p286]the decision on project debt levels is undertaken before the investment appraisal; in imperfect markets [68 ,p336] the investment decision is argued to proceed the financing decision; and, finally, when the authors discuss a joint investment-financing decision model [68 ,p349] the investment appraisal -- that is, the determination of the value of the project's unlevered stream -- proceeds the investment selection and choice of financing structure.

2. Two alternative discount models are suggested: one requires that the firm finance a fixed proportion of the project's initial outlay with debt; the other maintains that the firm should keep a constant ratio of debt to the value of the incremental cash-flow and employ this percentage to fund new projects. See [68 ,p314/315]. HALEY & SCHALL apply the former model in their subsequent examples.

which criteria it considers most appropriate.

The assumptions outlined above are prerequisites for the VAP's defense of the process of appraising projects independently, for as HALEY & SCHALL recognise, project interdependence would render the VAP decision procedure inoperative:

> "Since the after-tax cash-flow from a project depends upon the proportion that is financed with debt, a dependence of this proportion of debt financing on the other projects adopted implies a dependence of the project's cash-flow on which other projects are adopted. The consequence would be a need to evaluate all investment options simultaneously to get a joint maximising solution".
>
> [68 ,p286, fn15]

Although the above quote does not advocate a simultaneous solution to the joint investment and financing decisions (countenancing 'investment-set' decisions only), it does acknowledge that in the event of any interdependency existing between the accepted projects[1] then it would be erroneous to evaluate investments singly[2]. This undermines what the authors see [68,p305 & p328] as the main advantage of the VAP:

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1. Via, say, a collective influence of the accepted set of investments upon the debt raising capacity of the organisation which, in turn, affects the VAP's projects appraisal criteria (which is very sensitive to the effects of more debt) making more projects appear attractive which creates more debt capacity etc. etc..
2. See AMEY [1] or BROMWICH [24].

viz; it enables the investment decision to be decentralised, thereby providing management with a simple tool of analysis for project selection at divisional level[1]. The associated financing decision is considered of secondary importance, especially in perfect capital markets where:

> "Financing decisions by the firm are no more than the determination of who has rights to what part of the future cash-flow of the firm".
>
> [68 ,p217]

However, when they later discuss imperfect capital markets HALEY & SCHALL have to concede, albeit reluctantly, that a mutual relationship does exist between investment and finance:

> "If optimal decisions require a simultaneous solution of both the investment and financing problems, it is no longer possible for management to decentralise investment decisions within the firm. In other words, all investment and financing decisions must be made "at the top". As a practical matter this would be an intolerable situation in large firms".
>
> [68 ,p328]

Their reason for considering the joint decision intolerable is argued

---

1. In perfect capital markets the decentralisation of the investment decision would be permissible as it will always be possible to raise extra finance for projects which yield a return greater than the market desired hurdle rate. However, in imperfect markets, where capital may be in short supply, decentralised project appraisal will be non-optimal to the total organisation because the base hurdle rate will propose a set of projects which exceed the financing constraint:
the project selection criteria has not isolated the optimal set of investments.

here to be unfounded: HALEY & SCHALL state that "a theoretically correct solution may require enumeration of all alternatives, which is impractical", [68 ,p328, fn.1] because if a company had "35 projects" a computer would take "about a year" to evaluate each possible budget [68 ,p359].

This fear is believed to be groundless[1].

It is argued here that the time, cost and effort involved in preparing a joint solution to a company's entire capital budgeting problems will undoubtedly be extensive, if not excessive[2].

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1. Advanced programming packages for mathematical programming models (for example I.C.L.'s, XDLA mixed-integer L.P. software) together with sophisticated procedures, where necessary, for searching over the primal or dual spaces of the L.P. to obtain an optimal-feasible solution can reduce very large problems to minutes of computer central core time (experience gained on reproducing joint decision models of the CHAMBERS type [30] verify this). For details of the Operational Research techniques involved see WAGNER [140] or HILLIER & LIEBERMAN [74].

2. Natural prejudice and recalcitrance, often based on a misunderstanding of the role of modeling, are serious obstacles to the introduction of such techniques into companies (as, no doubt, was the case with DCF some time ago). On the one hand, financial executives whom I have interviewed dismiss models on the belief that project appraisal and treasurership are such fundamental areas of management that they should not be delegated ("to equations"). In fact, the instigation of such procedures would probably demand a more rigorous analysis and structuring of the decision which, together with a detailed specification of corporate policy and objectives, should give management an increased confidence in the decisions that are taken (after all, models are only advisory). To some firms, however, modeling will represent an expensive 'toy' which demands highly skilled personnel and computer hardware. The effort involved in preparing an efficient data support system by modifying the financial and management accounts (into cash-flow data --- arguably a worthwhile exercise in itself) will place an intolerable burden on already severely strained management. (See, for example, the research study by ROCKLEY [116] into the capital budgeting procedures in U.K. companies -- the pressure on management frequently precludes all but the most rudementary appraisal). Nonetheless, it is argued here that financial management can be strengthened greatly through the use of such comprehensive planning tools.
For a review of the acceptance of mathematical programming models of the joint investment and financing decision in practice see GRINYER [65] and GRINYER & WOLLER [66].

However, by pursuing the policy of separating the decisions, for reasons of administrative convenience and delegation alone, the company may be led into potential errors of sufficient magnitude and seriousness that the costs involved would warrant a full consideration and analysis of the numerous interdependencies -- this will be seen to be particularly crucial in the leasing decision.

The reluctance of HALEY & SCHALL to agree with this argument is presumed by the writer to be based on their belief that an optimal financial structure probably exists (in the guise of an investor preference for a certain debt-equity ratio) but management only has 'hunch' or 'experience' to rely on when making financing decisions:

> "In our opinion there is no existing procedure or theory that provides the optimal solution to the financing decision; the determination of the proper mix of financing is still primarily a matter for the informed judgement of management".
>
> [68 ,p249]

Given this belief, financing strategy and policy assumes the function of a 'given parameter': management cannot elect to better the collective will of the market through any analytical procedure or opportunist action[1].

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1. HALEY & SCHALL remark [68 ,p242]: "For any given financing policy adopted by the firm, there are likely to be investors who prefer that policy. These investors will become its shareholders. Hence, each firm will attract a "clientele" of shareholders who prefer the policies of the firm they hold. A firm that does not maintain any particular policy will be relatively unattractive to all investors since it is "unreliable". Consequently, firms should establish and maintain a given policy, making few changes over time and then only after careful consideration". --- (emphasis supplied).

As such the investment decision is the principal concern of financial management: the VAP reflects this philosophy, with a "simple" process for estimating the appropriate debt level to attach to a project annexed to the analysis. If, however, a case can be made for integrating the two decisions then the VAP no longer holds -- as HALEY & SCHALL frequently acknowledge [68 ,p174, 286, 329 and 353].

Consider now a further important issue in the VAP: the choice of discount rate. It is reasonable to suggest that the estimation, determination or observation of the appropriate discount rate to apply to a project's cash-flow is the most difficult practical problem associated with a VAP investment decision: and one that is never given more than cursory discussion by HALEY & SCHALL. The question of where management actually obtains (or calculates) the project discount rate, which is considered here to be the pivotal point in the applicability of the VAP, is left unresolved. On a theoretical level such a problem is reasonably dealt with under perfect market conditions; but the assumptions necessary to support the correct identification of the discount rate neglect the existence of interdependencies which occur between the I & F decision in imperfect markets. Thus, the VAP assumes:

1. "Management and investors agree on the expected value of the stream provided by any project and that a single discount rate is used". [68 ,p272]
2. "The risk of a firm's securities is unaffected by investment in the sense that the applicable preinvestment and postinvestment discount rate are the same". [68 ,p310]

3. "Firms maintain a constant ratio of debt to value[1]" [68 ,p310].

4. "Investment cash-flow streams are level perpetuities" [68 ,p20].

The stance taken in this Thesis, and that taken by HALEY & SCHALL, are difficult to reconcile because once imperfections are accepted, and interrelationships are recognised to exist between projects, then it is no longer valid to appraise projects independently. Thus, the valuation of a project's cash-flow stream by a unique discount rate is argued here to be incorrect because of the existence of significant[2] interdependencies between the supply and demand for capital. This makes it necessary to appraise projects by a discount rate which reflects the dynamic relationship between the investments which are accepted and the financial package which supports them. As previously noted, however, this does present computational difficulties[3].

III PRACTICAL PROBLEMS IN IMPLEMENTING THE VAP

To obtain the discount rate in the VAP analysis (in general several

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1. This assumption presents the VAP analysis with a particularly difficult interdependency which is noted by the writers but thereafter ignored: viz, "The amount of bonds (debt) issued to finance the investment cannot be determined before a determination of the increment in the value of the firm resulting from the investment" [68 ,p310]. But, the change in the value of the company caused by the investment depends upon the level of debt used in that investment!

2. Assumptions 2 and 3 are particularly at variance with this reasoning. It has previously been argued in Chapter 4, that in a dynamic solution to the joint I. & F. decision, the discount rate and capital mix are in a state of flux until the optimal solution is obtained.

3. As AMEY notes "In general a programming approach is indispensable where there are interdependencies" [1 ,p72].

rates will be required[1]) is argued here to demand a totally unrealistic and infeasible transfer of information between the company, its present and potential shareholders.

Implicit in the VAP investment appraisal procedure is the assumption that management will declare (by way of prospectus?) each potential capital investment -- for this would be the only way they could obtain the appropriate market discount rate for each project. But,

1. How many people or institutions shall receive this prospectus;
2. What restrictions shall be placed on commercial security;
3. When is a capital expenditure proposal of sufficient monetary size and development to be worthy of offer to the public;
4. Would the prospectus include R & D expenditure; non-profit making investments covering employee welfare; overseas investment;
5. Does the shareholding public possess sufficient commercial, accounting, engineering and marketing skills and experience to be able to deduce the worth of a project;
6. Will such collective decisions be conservative, restrictive and possibly lacking in entrepreneurial flare;
7. When the project is offered to the market how much faith can the investor place in the cash-flow projections of management, will

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1. HALEY & SCHALL state that it will be necessary to obtain a single discount rate for each project opportunity [68 ,p274].
However, "The advantage to the model lies in the likelihood that opportunities may be classifiable into groups of comparable risk. In this case a single discount rate may be used for all opportunities within a classification. If the number of rates to be estimated is less than the number of opportunities to be evaluated then it is an obvious advantage to the model".

[68 ,p273]

they be guaranteed or audited in some way as a means of validating extravagant claims.

8. Will investors disregard long term objectives in favour of short term benefits.
9. Should companies issue data piecemeal, project by project, as the VAP suggests, or.
10. Should they publish a detailed specification of investment opportunities upto some future date -- on the assumption that the investor will be able to exercise a more coherent judgement, promoting and selecting a corporate strategy which in toto reflects or produces his desired utility.
11. How many projects can an investor assimilate on one occasion; must the company distribute information evenly throughout the year or all at once on a given date.
12. Can the staff of an Investment Trust or Pension Fund which controls a well diversified multi-million pound portfolio, covering numerous companies, seriously be expected to produce discount rates for countless thousands of projects.
13. Will investors be able to differentiate between projects with sufficient sensitivity; can they adjudicate between mutually exclusive projects; can they recognise the worth of central engineering equipment which may yield an unspectacular profit but is nonetheless an essential asset; will they be able to recognise a dubious or misrepresentative investment prospectus.
14. Can the 'consensus' view of the shareholders on what the appropriate discount rate is, be accomplished in a realistic time-period.
15. Will the system mean that projects may be delayed or lose relevance

through shareholder inertia or disagreement.

16. Will the rapid replacement of vital equipment which say has unexpectedly broken-down be forestalled until a shareholder ballot has taken place.
17. What level of capital expenditure will be left to the discretion of management without contacting the shareholders; what criteria do they use when spending this capital.
18. How many shareholders are considered to form a quorem when decisions are taken on project discount rates.
19. Does a company use the mode, mean or median of the distribution of discount rates which have been proposed by the shareholders.
20. Is there a right of appeal against a particular choice of discount rate -- besides selling the company's shares.

IV SUMMARY

In summary, therefore, the VAP is sound within the theoretical confines of the perfect capital market where it is feasible to predict how investors would evaluate incremental income streams eminating from a single project. However, when imperfect capital markets are considered it is concluded that the information transfer necessary to approximate to perfect market conditions effectively precludes the working of the VAP.

Thus, projects must be evaluated by a common hurdle rate and not, as the VAP suggests, by any form of discriminatory analysis which uses individual hurdle rates and neglects the important interdependencies that occur in capital budgeting. Hence, in the discussion of previous writers on the leasing decision which takes places in Chapter 6, the following procedures have now been argued to be incorrect:

1. Appraising a cash-flow stream by an individual discount-rate which is argued to reflect its risk profile or market value to the supplier of a single form of finance.
2. Appraising a financing decision by a discount-rate which is either the implicit interest rate of the contract or the corporate borrowing rate.
3. Including in the debt or lease repayment schedule the inherent interest cost of the contract.

This should be removed from the cash-flow stream because it is already subsummed in the corporate cost of capital discount rate.

5.3 MATHEMATICAL PROGRAMMING MODELS OF THE I & F DECISION

I INTRODUCTION

Throughout this Thesis there has been constant reference to the inter-dependencies that exist between the investment and financing decisions, and frequent appeals for management to instigate a fully integrated planning system within their organisation. The vital necessity to undertake comprehensive financing planning has been expressed thus:

> "Few if any important financial decisions can be made solely in terms of considerations relating to the moment in time at which the choice is made. Invariably current acts have direct implications for future acts, and future possible acts or events have direct implications for the present. Every investment choice modifies the future pattern of funds flow and changes the investment choices of the future as well as the remaining choices in the present. Every financing decision is related to the next financing decision and alters the options open the next time around. Every evaluation of the options open in the present will be made with an eye to the probable events and circumstances of the future. The interrelatedness of events and acts is a fact of business life, as it is of life in general, and in its broadest sense financial planning is the effort to identify and evaluate the significance of this interrelatedness".
>
> DONALDSON [40 ,p172]

In this section consideration is given to one of the more prominent

models which endeavours to integrate the I & F decisions by means of a linear programming mathematical model. The important contribution of CHAMBERS (see the introduction to this Chapter for a defence of this choice) has been selected to demonstrate the growing field of financial modeling.

To commence this discussion the model will be formally stated, with subsequent explanation, and reference to the equations and their economic implications, being made during the text which follows.

$$\text{MAXIMIZE} \qquad \sum_{t=1}^{H-1} \sum_{j=i}^{n_t} V_{tj} X_{tj} \qquad : 1$$

$$\text{SUBJECT TO} \qquad L^T / E^T \leq g \; ; \; T=1, \ldots H-1 \qquad : 2$$

$$F_o^T + \sum_{t=1}^{T} \sum_{j=1}^{n_t} F_{tj} X_{tj} = D_o^T + N_o^T \; ; \; T=1, \ldots H-1 \qquad : 3$$

$$0 \leq X_{tj} \leq 1 \quad \text{for } j=1,\ldots n_t' \qquad : 4$$

$$X_{tj} \geq o \qquad \text{for } j=n_t' + 1, \ldots n_t \qquad : 5$$

where X_{tj} = The variable denoting acceptance or rejection of project j in period t; X_{tj} is 0 if the project is rejected and 1 if the project is fully accepted. Fractional values imply marginal acceptance of the project.

V_{tj} = The value of the cash-flow stream generated at or after the horizon, H, discounted to a single value at the horizon.

L^T = The total value of debt at the end of period T.

Fo = Cash Flow from "old"projects.

F_{jt}^T = Cash Flow from "new" projects.

E^T = The total value of equity at the end of period T.

g = The specified leverage or gearing ratio.

D_o^T = The dividend payment as planned at time 0.

N_o^T = The debt repayments as planned at time 0.

The 'projects' consist of:

1 to n_t' = Investment projects within the company. A total of 14 projects are specified in each of the 5 years upto the horizon. The list of project alternatives is the same in each year upto the horizon.

$n_t' + 1$ = The investment of surplus corporate funds in one-year Government Securities bearing a constant yield.

$n_t' + 2$ = The possible acquisition of another company.

$n_t' + 3$ = The issue of Rights in any year upto the horizon.

$n_t' + 4$ = The issue of a corporate debenture.

$n_t' + 5$ = The investment of surplus corporate funds in the common stock of other companies.

n_t = 1 to $n_t' + 5$.

Equation 1 = The Objective Function; or the net present value of the company at the horizon: NPVH.

Equation 2 = The Gearing Constraint; a ratio of total debt to the book value of equity : g = 0.5.

Equation 3 = The Cash Balance Constraint; the equation may be stated: cash flow from old projects + cash flow from new projects = dividend + interest paid.

Equation 4 = All investment projects to be accepted at some fract-

ional value between 0 and 1.

Equation 5 = All financing 'projects' to be greater than or equal to zero.

From this formal statement of the model it is immediately clear that it encompasses a great many possible courses of action open to the company: from acquisitions (which henceforth shall not concern us) to the issue of shareholders rights. Indeed, the results of the model will indicate a series of investments to be undertaken in each of the five years upto the horizon, together with a complementary list of financing strategies to be adopted in the various years. Thus, the potential to assist, direct and control corporate financial management through such a model is quite apparent. However, in order to fully comprehend its advantages and disadvantages, it is necessary to consider its mathematical structure and the economic logic upon which it was based. To accomplish this satisfactorily it is essential to review the various 'classic' problems in financial modeling[1]; the most important of which is first discussed in its historical context.

II THE HORIZON PROBLEM

The CHAMBERS programme is a development of the two original models proposed by WEINGARTNER. In his first model [141], WEINGARTNER was concerned to demonstrate that linear programming techniques could be applied to solve the LORIE & SAVAGE [89] multiperiod capital rationing problem[2].

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1. See BERNHARD [17], AMEY [1] and BROMWICH [24].
2. See QUIRIN [113, p177-185] for an alternative solution to this problem.

It was shown that L.P. techniques could provide a computationally feasible method capable of solving the vast combinatorial problem of analysing every possible group of projects in an effort to find an optimal solution to a set of projects subject a constraint on capital. WEINGARTNER's initial model was, therefore, a maximisation of the NPV of the optimal project set subject to a budget restriction on available funds. Thus,

$$\text{MAXIMIZE} \qquad \Sigma\, b_j\, x_j$$

$$\text{SUBJECT TO} \qquad \Sigma a_{tj} x_j \leqslant D_t$$

$$0 \leqslant x_j \leqslant 1$$

where: b_j = The NPV of project j : note, the contribution of each project has to be specified <u>prior</u> to the model being run.

a_{tj} = The capital requirement of project j in time t.

D_t = The available level of funds.

BAUMOL & QUANDT [13] were subsequently to show that the WEINGARTNER model contained a fundamental inconsistency in the specification of the objective function:

> "If there is capital rationing, and external rates of interest are irrelevant, we cannot simultaneously insist on a present value formulation of the objective function and have the relevant discount rates determined internally by our problem".
>
> BAUMOL & QUANDT [13 ,p325]

The B & Q problem, which is the modeling equivalent of the HIRSHLEIFER

paradox, manifests itself in the inconsistency implicit in the model's dual and primal solutions:

> If the objective function is the maximisation of the NPV of the set of projects which are the subject of budget constraints, then, since the dual values associated with the budget constraints give the marginal efficiency of funds -- or the discount rate --, it is impossible to specify the value of the objective function -- or primal problem -- until the dual is solved; but it is impossible to solve the dual until the primal objective function is known.

An impasse is observed, with the apparent conclusion that, in their above form, mathematical programming models are incapable of dealing with the capital rationing problem. B & Q reformulated the WEINGARTNER model by replacing the objective function with one that maximised the value of withdrawals from the company. The discount rate was thereby exogenously determined as the shareholders expected utility of the funds, or dividends, they would receive. However, the applicability of this procedure has been frequently criticised in view of the problems associated with obtaining utility functions[1], so that very few of the current financial models employ this approach.

In an attempt to circumnavigate the B & Q problem, WEINGARTNER developed the "Basic Horizon Model", which represents the forerunner of much of the present writing in modeling, including CHAMBERS:

> "The basic horizon model requires selecting a time period prior to which outlays and revenues of potential investments are stated explicity but beyond which the actual . . . . . .

1. See WEINGARTNER [141], BERNARD [17] and ASHTON & ATKINS [6].

flows associated with these investments are collapsed into a single quantity, the horizon value".

WEINGARTNER [141 ,p153]

Thus, the model attempted to maximise the value of the firm at a given period some years in the future instead of time zero. The second WEINGARTNER model may be specified thus:

$$\text{MAXIMIZE} \quad \sum_{j=1}^{n} a_j x_j$$

$$\text{SUBJECT TO} \quad -\sum_{t=o}^{T-1} a_{jt} x_j \leq D_t$$

where:

$$a_j = \sum_{t=T}^{\infty} \left[\frac{\ldots a_{jt} \ldots}{(1+r)^{t-T}} \right]$$

The principal feature of this formulation, which is also to be observed in CHAMBERS, is the temporal separation of the objective function and the constraint: the constraint runs during the period t=o to T-1, whereas the objective function covers the post-horizon period only. Hence, the duals on the pre-horizon constraints have no influence upon the post-horizon discount rate[1].

Consider now how the CHAMBERS model engages the horizon problem. It will be noted from equation 1, the objective function, that the NPVH

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1. In both the WEINGARTNER and CHAMBERS model the horizon discount rate is a pre-determined weighted average cost of capital. Therefore, it assumes a given dividend policy, a given and attained financing and capital structure policy, and some assumptions about coincidental managerial and shareholder attitudes.

represents a perpetual rate of return on the value of the firm at the horizon[1]: the model uncouples the pre- and post-horizon time periods so that prior to the horizon its prime concern is with the managerial problems of selecting an optimal investment and financing plan, and that at the horizon it maximises the level of reinvestable funds available to the shareholder. Is this uncoupling successfully achieved by CHAMBERS?

One significant problem with the model concerns the horizon posture of the firm: the link between the pre- and post-horizon circumstances of the company is the weighted average cost of capital hurdle rate; which is dependent upon the level of leverage being at its maximum value[2]. CHAMBERS applies a discount rate based upon a leverage ratio of 0.5, (constraint equation 2 : $g \leqslant 0.5$), but fails to specify that at the horizon g will be at its upper bound, $g = 0.5$. There is, therefore, a possibility that the gearing constraint could be under-attained.

It is quite possible to resolve this issue by ammending the year 5 leverage constraint from $g \leqslant 0.5$ to $g = 0.5$; but in many respects this is inappropriate. Firstly, it pre-judges the financing decision (thereby eliminating the raison d'être of the integrated model); secondly the consequences of such an action would not be confined to the final period of the model, but would precipitate alterations to the whole of the pre-horizon investment and financing plans in an effort to ensure that capital equilibrium was reached at the horizon; the third problem concerns the artificiality of the solution: the model cannot cope with a capital rationing situation at the horizon (the B & Q problem being immediately evident) so it has, in effect, to coerce the pre-horizon plans into reaching a spurious terminal solution. The interdependency between the evaluation

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1. Equal to the company's weighted average cost of capital.
2. Numerically, 9.8%, being derived from the cost of debt and equity when g, the leverage ratio, is 0.5; see [30,p271]. If this ratio is not achieved then the terminal value of the company, the NPVH, will be incorrectly valued, resulting in an incompatibility between the managerial and shareholder sections of the model.

of NPVH, the appropriate discount rate, and the internal results of the model has been deliberatly evaded, albeit consciously, by CHAMBERS [30 ,p271, fn1]. The mathematical apparatus to deal with these difficulties has not yet been constructed in the literature.

As the CHAMBERS model cannot guarantee that the leverage posture of 0.5 will be attained, two possible situations could have occured to prevent it. Firstly, the company could have reached the horizon with surplus, or uninvested, equity earnings:

> "If the firm expects to reach the horizon with such a large net cash-flow relative to its opportunities for profitable investments that it is not able to take full advantage of its debt capacity, it must be expected to have less than optimal leverage and to apply too high[1]a discount rate to post-horizon cash-flows".
>
> CHAMBERS [30 ,p290]

Thus, NPVH is incorrectly valued. Furthermore, because extra funds are available at the horizon in excess of the profitable investments at hand, and by implication the necessary capital equilibrium has not been reached, CHAMBERS has little alternative but to propose that the pre-horizon dividend policy be increased to a higher level in order to achieve the correct balance at the horizon. However, CHAMBERS fails to note the important interdependency caused by this action: if pre-horizon dividends

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1. As previously noted, the post-horizon discount rate is exogenously determined and fixed at the commencement of the analysis. As such, management will use this rate regardless of the attained capital structure. The choice of a predetermined rate may have been wrong, but it cannot be made more wrong because the model fails to achieve the desired horizon posture.

are raised then the cost of equity and consequently the weighted average cost of capital will rise, thereby affecting the post-horizon discount rate, the company valuation and the pre-horizon selection of projects.

The alternative circumstance open to the company at the horizon is to attain the desired leverage ratio of 0.5, yet still be subjected to the problem of capital rationing, [30 ,p286-90]. This situation under-values the worth of NPVH, because the model "abstracts from consideration of individual time periods after the horizon, and represents the investment opportunities (available to the shareholder through the company) by a range of perpetuities facing the firm at one moment in time" [30 ,p289], the level of this yield being equal to the company's weighted average cost of capital. The significance of arriving at the horizon in a state of capital rationing, however, is that all the unique investment possibilities available internally will not be exploited. CHAMBERS suggests that:

> "By investing further funds at the horizon in the special opportunities facing the firm, instead of investing in the market at large, stockholders will obtain this surplus. The value of this surplus does not depend upon the choice of investments and finance up to the horizon; it measures the difference between investment in the actual opportunities prevailing after the horizon and investment at only marginal rates. Stockholders can obtain title to this surplus by issuing the appropriate amount of debt and rights at the horizon".
>
> CHAMBERS [30 ,p298]

By contributing further funds the shareholders can participate in the

higher earning potential of the company: the marginal efficiency of capital offered by the project set is higher than the yield on equivalent-risk equity holdings in the market. CHAMBERS proposed "escape route" is vital if capital equilibrium is to be attained at the horizon: for only then can the use of a pre-determined discount rate be vindicated; the B & Q paradox concerning the marginal efficiency of capital avoided; and NPVH correctly valued.

It is argued here that the need to introduce ex post financing alternatives and updated dividend policies seriously weakens the model's solution. If it cannot produce funding strategies which are appropriate at the horizon (the focal point of the model), then contrived manipulation of the pre-horizon decisions to force the solution towards a certain capital mix[1] introduces an artificiallity into the procedure which dilutes much of the author's claim that the model integrates the I & F decisions. It is recognised, however, (see BERNHARD's review of modeling [17]), that the introduction of financial alternatives into a multiperiod model "has not yet been effectively handled in a mathematical programming context".

Some of this dissatisfaction with the introduction of debt and equity into financial models may be observed in CHAMBERS treatment of debenture and rights issues in the context of horizon valuation. Consider the following specification made by CHAMBERS for a debenture:

15 year duration, £1000 debenture with a £30 floatation cost, a 6% before-tax interest rate, 40% Corporation Tax, and all tax flows staggered by one year. The following after-tax cash-flow series arises:

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1. It is perhaps more noteworthy that, 'this certain capital mix' is not even appropriate --- it is an unnecessary rationing if shareholders are then encouraged to introduce more funds!

YEAR	1	2	3	4	15	16	17
CASH-FLOW	970	-60	-36	-36.....	-36	-1036	24

This stream has an IRR of 3.96%; the rate used to establish the weighted average cost of capital. On the assumption that the debenture is undertaken in year 1, and therefore 11 years of cash-flow extend beyond the horizon, then the following technique is employed by CHAMBERS to value the debenture:

$$NPVH = -36 - \frac{36}{(1.0396)} - \frac{36}{(1.0396)^2} \ldots\ldots\ldots\ldots \frac{-1036}{(1.0396)^{10}} + \frac{24}{(1.0396)^{11}}$$

NPVH = -95.3

This valution is incorrect. The cash-flow used in evaluating the debenture at the horizon contain elements of servicing charges which are already incorporated into the weighted average cost of capital. Thus, double counting of the interest cost is evident. In order to eliminate this problem the debt repayments should consist of the capital portion only[1].

The issuance of shareholders rights, and their valuation at the horizon, is a special feature of the CHAMBERS model. To simplify matters it is assumed that all the rights will be taken up by the existing body of equity holders, and that the issue price per share holds constant throughout the period of the model regardless of the prevailing situation. The assumptions are undoubtedly simplistic -- alternative share-price schedules could be imputed into the model, but it is unlikely that a procedure could be devised which actually predicted a share price

1. For an example of this procedure see Tables 9.3 & 9.4, Chapter 9. However, it does present a most serious problem because the cash-flow series is then insoluble: a positive interest rate cannot be found for this series.

from the investment and financing strategies chosen by the model. CHAMBERS acknowledged that the whole issue of introducing rights into the model leaves it vunerable to theoretical dispute and, as such, management must choose from a set of efficient solutions that which they feel will be most beneficial to the company's shareprice. In an effort to evade the whole problem CHAMBERS treats a rights issue as a negative investment project: an inflow of funds followed by an outflow of dividends.

> "Managers should be led to make a new rights issue only if there is some increase in the value of the firm to existing shareholders after giving subscribers to the new issue a return (in this example) of 12%. A NPVH of the new rights issue is therefore defined as that amount at the horizon which, taken together with the dividends to which they will be entitled over the planning period, gives a return of 12% to new investors".
>
> CHAMBERS [30 ,p270]

Thus, given an issue of 100,000 share at £1.60 each, issued in year one on the assumption of a 12% return and a pre-determined dividend policy of £21,000, £22,000, £23,000, £24,000 & £25,000 in each year upto the horizon we have; (all figure in 1000's):

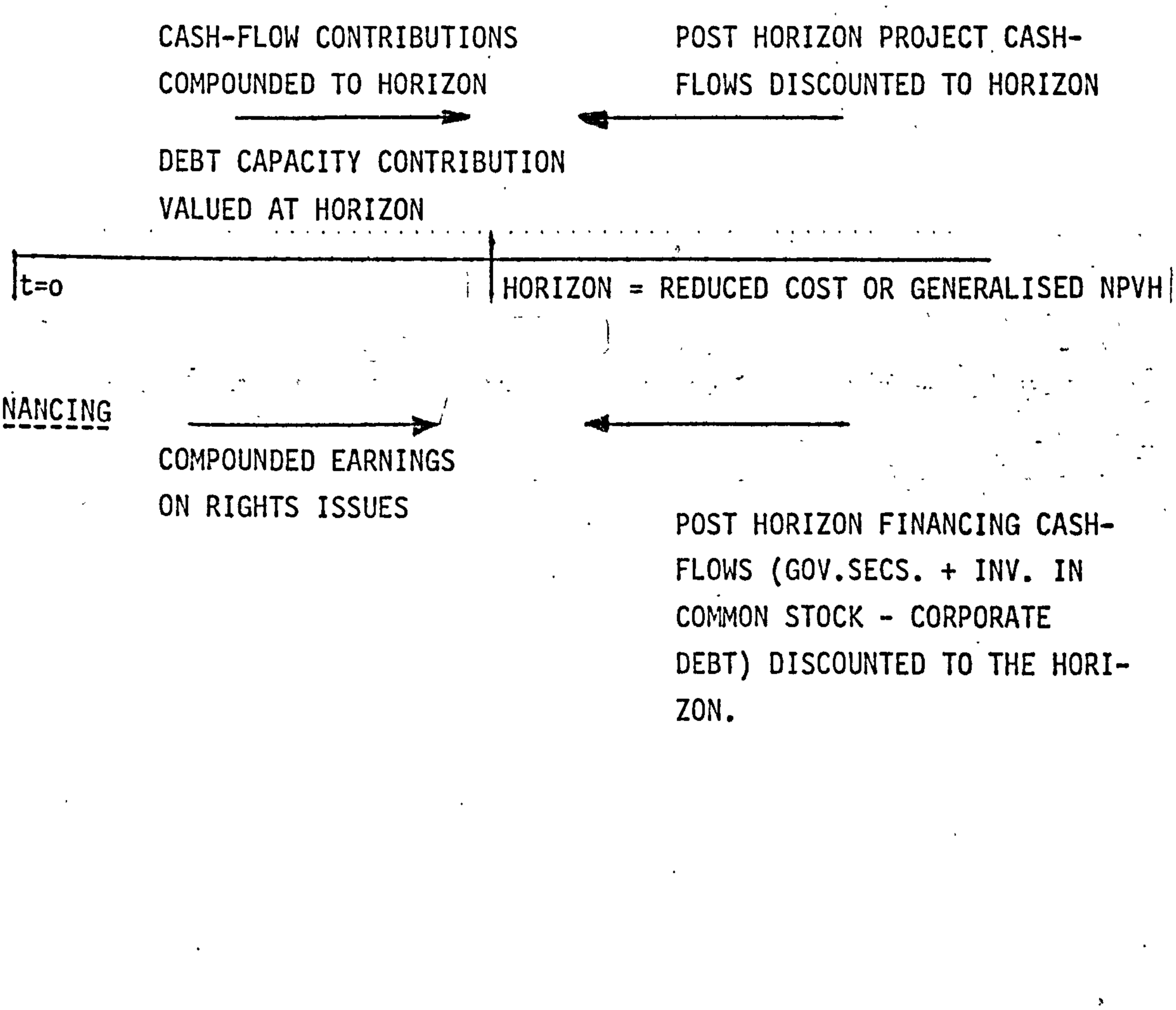
$$NPVH = - [160\ (1.12)^5 - 21(1.12)^4 - 22(1.12)^3 - 24(1.12)^2 - 25(1.12)]$$

$$NPVH = - 158.9$$

In order for the rights issue to be worthwhile to the existing shareholder body, the use of the capital so obtained must increase the horizon value by more than 158.9.

The valuation of rights at the horizon is simply a compound return of 12% on the initial capital input and dividend outflows. The total NPVH of the firm is, therefore, the value of the various financial streams, plus accepted projects, discounted back to the horizon, less the terminal value of the incremental equity issue. This can be demonstrated diagrammatically below (other aspects of Figure 5.1 will be returned to later):

FIGURE 5.1



Two further issues may be raised concerning the horizon.

Firstly, there seems to be no logical reason (in theory and especially in practice[1]) for the superiority of one horizon date over another. However, the stability of the solution during the early years of the model seems an important factor if, for example, the project analyst was experimenting with horizons of say 4,5 and 6 years. Variations in the set of projects undertaken, or the financing strategy to be adopted, during the common years would hopefully be minimal (although in view of the previous comments on the model's desire to achieve capital equilibrium at the horizon, it does seem possible that discrepancies may occur). Presumably, the further into the future is the critical valuation the more acceptable the model will be[2]. However, this leads to the second issue which concerns the validity and accuracy of the model's information at and beyond the horizon. Clearly, this data is of fundamental importance, being the catalyst upon which all pre-horizon decisions hinge. Yet, post-horizon data, being so distant, is often fragmentary, often based upon aspiration and optimistic objectives and, in general, only an extrapolation of trends rather than anticipated events (the latter being especially true for the financing options). Not surprisingly, the coincidence of prediction and actuality

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1. Commenting upon the results of a comprehensive survey of financing policy in the USA, DONALDSON concludes: "It is not too uncharitable to say that the period of many a long range forecast (three, five or ten years) is more a function of the length of the ruler used to extrapolate the past than it is of any specific limit to corporate vision". [39 ,p177]
2. FAWTHROP notes that this may be "distance lending (managerial) enchantment to the view": a prevarication of the issue of what constitutes a company's most appropriate planning period [46].

in the long-term is noticably rare. Thus, the model's objective function is seen to be maximising that which management knows least about. This inherent deficiency in the programme's specification exposes a serious weakness in the whole concept of horizon type models : which once noted, cannot be expected to reassure a pragmatic management, or stimulate it to produce the vast quantities of data input that are needed to make the model operational.

Despite these very real practical problems, certain aspects of the integrated investment and financing decision are excellently comprehended within the CHAMBERS model. The most notable contributions are in the area of "linkage"[1] and in a re-specification of the discount rate to be applied in project selection.

III FINANCIAL LINKAGE AND THE APPRAISAL CRITERIA

A great deal has previously been mentioned about the concept of financial linkage and the relationship leasing plays within it. In this section, consideration is given to the way in which the appraisal criterion employed in the CHAMBERS model embodies linkage, and how its contribution to the selection of other projects is quantified.

The model's hurdle rate comprises of three distinct elements: the project's NPVH; the cash-flow effects; and the debt capacity effects.

> "At the horizon the firm will select projects by the net present value rule, using as a discount rate a weighted average cost of capital; but up to the horizon it specifies an entire investment strategy year by year".
>
> CHAMBERS [30, p269]

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1. The reader is referred to Chapter 4, section 4.6 for a discussion of the "linkage" concept.

Within the context of the 'year by year' selection process, it is to be noted that [30 ,p271, fn1] "the discount rates (the duals) applicable up to the horizon ..... will appear as outputs, rather than inputs, of the model". Thus, the marginal efficiency of capital in each period is established within the model: it is an interperiod rate which is not to be confused or compared with an average internal rate of return.

CHAMBERS argues[1] that the traditional NPV hurdle rate neglects two important contributions that a project can make to a company: the first is the provision of additional cash-flow which, as previously described in the discussion on financial linkage, assists further investment and diminishes the need for new financing; and, secondly, the project's cash-flow augments the equity of the company thereby establishing debt capacity.

Thus, as shown in Figure 5.1 , the acceptance of a project is dependent upon two factors: the NPVH, which operates in the post-horizon period; and the year-by-year effect of the linkage contribution of each project operating in the pre-horizon period.

The CHAMBERS model demonstrates how the fundamental NPV criterion overlooks the important contribution of linkage in the promotion of contem-

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1. For a mathematically rigorous treatment of this argument see MYERS [105]. He develops an "Adjusted Present Value", APV, criterion which comprises of the project's incremental NPV plus an ascribed value associated with the project's shadow prices on the debt capacity and cash constraints of the company. While the CHAMBERS & MYERS concepts are essentially similar, the APV criterion is intended to apply to individual projects in isolation. However, the relevant duals can only be obtained through consideration of the interactions of the entire project set. Thus, it is difficult to envisage how the MYERS approach could establish the individual project data (the shadow prices). The CHAMBERS L.P. model, however, establishes the relevant duals as a matter of course.

porary and future projects: with the dual values quantifying this support. For example, if the NPVH (or IRR) of a project was superficially not very attractive (or, indeed, if two projects had the same NPVH -- the linkage duals then being used to identify the more favourable investment), it is possible that the project could have a substantial linkage dual in one or more periods which was sufficiently beneficial to the whole project set that its acceptance was assured. Hence, if a project was to provide an advantageous boost to liquidity in a period of tight capital rationing[1], the donor project would, in effect, be granted the marginal contribution to the set NPVH brought about by its own acceptance plus the benefit to be derived from the newly adopted project[2].

The second aspect of linkage which is unconsidered in the basic NPV calculation, but which is incorporated into the specification of the CHAMBERS model, is the effect of accepting a project upon the debt capacity of the company. If an investment yields a net cash-flow contribution it has, as a result, increased the equity base of the firm. Thus, the acceptance of a project has created an opportunity to raise a specific amount of further debt: for example, if £10 of equity were made available from the project, and g=0.5, then £5 of debt capacity automatically becomes available. Again, the model credits the donor project with the value of the debt capacity dual: or, the increment in the set

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1. See also sub-section IV infra.
2. The reader is asked to note the similarity of this argument to that which will be proposed in Chapter 9 when the concept of "Residual Capital Balances" is quantified. Futhermore, in anticipation of a future discussion, note that the value ascribed to the dual is effectively counted twice: once as part of the linkage dual for the initial project, and secondly as part of the basic NPVH of the newly initiated project.

NPVH caused by raising the extra debt capacity and investing it in profitable opportunities.

In summary therefore, the appraisal criterion at work within the CHAMBERS model takes into account two of the most important interdependencies which attach to the acceptance of a project[1]. In this respect the model evinces a powerful analytical technique for investment selection which, prima facie, is much superior to the standard NPV criterion. This last statement is now discussed.

IV INTEGRATION OF THE I & F DECISION WITHIN THE MODEL

From what has already been said it is clear that the horizon posture of the model is of great significance: it is the focal point of the programme and the platform from which all subsequent decisions are made. Yet, the horizon position will very probably contain an incompatibility between the quantification of NPVH, and the discount rate, which demands an ex post modification of the dividend policy, or horizon funding strategy, in order that the vital capital equilibrium is secured. To avoid the BAUMOL & QUANDT problem (which is, arguably, the most difficult, yet essential, task of integrated horizon models) an artificial harmonisation of capital supply and demand has to be made. This amendment to the model's solution manifestly indicates the programme's inability to integrate the two decisions satisfactorily.

The detached nature of the investment and financing processes within the model is perceivable at the horizon, and moreover is discernable within the modus operandi of the pre-horizon investment and financing selection.

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1. But it does fail to consider inter- period cash-flow smoothing which would also boost the company's borrowing credibility.

"Variations in the estimated results from old projects, or from any new projects, affects the firm's optimal financing plan and market portfolio before they change the optimal investment in other internal projects. The opportunity both to raise funds and to invest them outside the firm appears to make its selection of internal investments more robust".

CHAMBERS [30,p282].

CHAMBERS considers that this conclusion is perhaps obvious in view of the model's enlarged scope: which is not just concerned with the WEINGARTNER problem of capital allocation subject to budget restraint, but has the more comprehensive brief of alleviating capital rationing -- a not unduly difficult task in view of the unbounded financial sources at the model's disposal[1]. CHAMBERS CONCLUSION LEADS, PERHAPS SOMEWHAT SURPRISINGLY, TO THE RELEVATION THAT THE MODEL IS IN FACT A HIGHLY SOPHISTICATED MECHANISM FOR SELECTING MARGINAL PROJECTS. 'Good' investments will always be selected (whether through the use of a model or a straight-forward NPV analysis)[2] and a 'robustness' of the project set is ensured. The structure of the model makes the investment decision largely predeterminable, artificially so, because a complementary unrestrained financing policy can always be established to support the pro-

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1. In the CHAMBERS model it is always possible to obtain an unlimited quantity of money at 9.8% by raising £2 of equity to every £1 of debt borrowed. The CHAMBERS model eschews the investment selection problems associated with capital rationing because there is no restriction on the total capital available to the company. While there is a limitation on the use of debt this does not imply capital rationing.
2. That is, a simple NPV appraisal of the project schedules used in the CHAMBER's model would select very nearly the same group of investments.

ject set.

Although there is a wide variety of financial alternatives within the model they, nonetheless, remain unrepresentative of the market activities which govern their use. The linearity property of the model precludes realistic adjustment to the cost or yield of one financing instrument in the wake of the acceptance of another[1]. This element of 'realism' has yet to be incorporated into mathematical programming models[2].

The computational 'logic' of the CHAMBERS model is faultless, but it frequently leaves the financial posture of the company exposed to apparently illogical or unreasonable solutions. CHAMBERS recognises that some of the proposed strategies appear "unrealistic" and somewhat perplexing by comparison to the conventional financing activities of some companies; nonetheless, they are strictly correct. There are two principal examples which deserve note: in year 2, a £106,000 debenture is raised, yield 3.98%, while simultaneously £151,000 is invested in the equity of other companies, yield 12%; in year 5, a rights issue of £564,000 is made, yield 12%, while a concurrent investment of £648,000 is made in government securities, yield 6%.

It is not argued here that such actions never occur in practice: monies are frequently raised, or amalgamated from internal sources, only to be invested or placed on deposit until such time as the relevant investment for which they were originally intended comes into operation.

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1. Although a 'stepped' interest rate function could be devised the interdependency between, say, the issue of debt and the resulting change in the cost of equity; or the price of rights and the concurrent profitability or capital structure of the company; cannot realistically be modelled.
2. See BERNHARD [17].

The maxim of corporate treasurership[1], that money is rarely sought, and even more rarely supplied, for unspecified purposes, is seemingly neglected in the CHAMBERS model[2]. This omission detracts from the practical worth of the financing solution.

One final point should be raised concerning the robustness property of the CHAMBERS model. The normal analytical procedure applied to solve a linear programme is to search for the optimal solution over what is called the primal space (the 'n-dimensional' picture of the model's equations). However, ASHTON & ATKINS [7] have shown that much valuable insight is to be gained by analysing the reciprocal of this problem which is found in the dual space (the 'n-dimensional' picture of the model's dual equations). If such a technique is used to scan the dual feasible region of the model's financing options, ASHTON & ATKINS show that the discount rate displays pre-determinable characteristics[3].

Two things follow from their findings: firstly, the marginal efficiency of capital can never exceed the weighted average cost of capital; and, secondly, because the dual feasible region can be predicted before the model is run, a simple "rule of thumb" technique[4] can be applied to

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1. See DONALDSON [39 & 40].
2. Or the ultimate source of the funds is so distant as to be indistinguishable.
3. This results from a mathematical property of programming models: optimal solutions only exist at the intersection of constraints. In the case of the discount rate, the intersections take place where financing options meet. The interest rate of each financing source establishes the slope of each line and, hence, it is possible to locate every intersection and what discount rates will eventuate from an optimal solution at that point. ASHTON & ATKINS show that the CHAMBERS model contains only two possible points: one occuring when the company is in a cash surplus position and equal to the after-tax return on government securities; and a second occuring when the firm is in a cash-deficit period and equal to the weighted average cost of capital. Thus the structure of the dual feasible region is rigidly defined.
4. The technique involves placing bounds on the projects net cash contribution plus the net contribution of the project to the debt capacity of the company. See ASHTON & ATKINS [7].

the list of available projects prior to the analysis by the model, which produces almost the same list of acceptable projects as the model would. The extra computational facilities of the model can only out-perform the "rule of thumb" on the very marginal projects. Clearly, a cost-benefit analysis of the model's cost against its superior ability to select the least profitable investments would not look favourable for modeling.

V DATA SPECIFICATION

Multi-period models of the type proposed by CHAMBERS can only function satisfactorily if they are supplied with an immense amount of data. Before the programme can be run a list of project opportunities available in each year upto the horizon has to be specified together with a period-by-period description of their associated operational and taxation cash-flows[1]. Furthermore, all financing options have to be defined and their individual costs established, a dividend policy has to be elected, and all on-going projects have to be quantified and incorporated.

When management was asked for their opinions and experience of financial models as part of the Industrial Survey, many expressed manifest reluctance to adopt them. The cost of establishing a corporate model, the difficulties of obtaining all the project and financing data[2], the dubious nature of the more distant data, together with the natural resistance to adopt largely unproven ideas, combine together to make management choose

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1. Taxation is highly simplified in the CHAMBERS model, and as such several very important interdependencies are overlooked. See sections 5.4 and 5.5 of this Chapter.
2. In the numerical example used by CHAMBERS a common investment opportunity schedule is employed in each period up to the horizon.

less sophisticated approaches to investment and financial planning[1]. Despite these very real problems, and the anticipated poor quality of some of the input data, it remains an inescapable pre-requisite of corporate financial management that long-range plans must be developed. The data will be common to any planning tool; and, as such, any criticism of its relevance or accuracy should be directed at the information system which provides it, and not at the model which merely uses it. The CHAMBERS model does not claim to produce the infallible optimal solution from a given set of data, rather it is seen by its author as providing management with a number of investment and financing plans from which a choice can be made.

> "The purpose of the model is to display a set of alternatives, and the role of optimisation is to ensure that the alternatives are efficient ones".
>
> CHAMBERS [30 ,p269]

VI SUMMARY

Despite its many faults, it may be stated that the model under decision provides: a rational framework in which complex plans and constraints[2]

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1. Their preference in such matters generally being directed to single issue models, for example the leasing decision, which attempt to solve a problem efficiently, economically, and with as much regard for the relevant interdependencies as possible.
2. Recent tendencies in the development of financial models have been towards greater sophistication in the number and complexity of the constraints; developing from WEINGARTNER's [141] simple upper bound constraint on borrowing into, for example, a bewildering profileration of 800 constraints in the model by HAMILTON & MOSES [72]. Indeed, in the latter case it is to be presumed that the feasible region is so small that the objective function is largely redundant, with the programming model simply being employed to obtain a feasible plan.

can be subject to rigorous analysis; it provides a medium through which various strategies may be tested and the resulting inter-relationships observed; it enables management to comprehend the effect of a particular policy or action upon other parts of the company; and, finally, it provides an accurate pointer to potential funding difficulting well in advance of their occurance.

Of course, models of the CHAMBERS type are not perfectly developed, as much of the previous discussion has indicated. None the less, it is the writer's belief that they will become increasingly used in the larger organisations to provide an analytical framework within which to consider the investment and financing decisions.

Hopefully, therefore, subsequent developments in the field of financial modeling will concentrate on the issues and problem areas that have been raised in this section of the Thesis.

5.4. CORPORATE TAXATION IN THE U.K. --

THE EFFECT OF THE IMPUTATION SYSTEM ON CAPITAL EXPENDITURE DECISIONS

I INTRODUCTION

An examination is made in this section of the Thesis into the impact of the Imputation System of corporate taxation upon the capital expenditure and financing decisions made by U.K. companies. As fiscal matters are notoriously complex, being in recent years the subject of frequent alteration to already detailed legislation, the discussion will be concerned with those issues that arise in the context of managerial decisions, rather than become enmeshed in the details of revenue law and liability computations.

In any commercial organisation tax strategy and planning are fundamental aspects of financial management which deserve the most thorough and detailed examination. Thus, I agree unreservedly with BUCKLEY when he comments:

> "One of the essentials of investment appraisal is to allow for the way in which tax impinges upon a project. The tax environment is critically relevant to investment appraisal and failure to take account of its full significance represents a failure to allow for one of the key factors in corporate investment policy, since the central objective of the aggregate of a company's investment is the generation of adequate net of tax cash flows".
>
> (emphasis supplied): BUCKLEY [27 ,p173]

Is the responsibility of the project analyst to correctly incorporate the tax cash-flows emanating from an investment and ensure that they fully reflect the realities of the company's current and expected tax postures? It would follow from this that the smoothing of tax liabilities, and their hoped for minimisation, is as important as any comparable corporate objective (such as, maximising sales revenue or minimising costs) because the financial repercussions of an oversight, misinterpretation or incorrect calculation in tax matters, is frequently expensive not only in itself but also in terms of the continuing consequences which result from the erroneous decision.

In the examination which follows of the potential implications of the relatively new (April 1973) Imputation Tax system, an inquiry will be made into its principal effects[1] upon the investment decision, and to a lesser extent the financing decision (which of course incorporates leasing), and how the integration of these two decisions affects the applicable tax rate for project cash-flows.

Consideration will also be given to the important possibility that the new system adds a third dimension to the interdependencies previously considered between the investment and financing decisions which complicates the process of project selection still further. A basic framework is suggested for the inclusion of tax management within mathematical models of the integrated investment and financing decision. The purpose

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1. The reader is advised that the discussion is concerned with major taxation issues in a 'ceteris paribus' investment --- that is, no account is taken of subsidiary cash-flows or tax-flow interactivities arising out of a set of circumstances particular to an individual organisation. Such tax computations as will appear may therefore be somewhat over simplified. The objective is to discuss principles rather than to illustrate computations of tax liability.

of this discussion is to promote ideas for further research by reviewing some of the problem areas that are to be expected in such an analysis. The debate is couched in descriptive rather than mathematical terms.

II A BRIEF RESUMÉ OF THE PRESENT SYSTEM OF U.K. CORPORATION TAX

The Imputation System of Corporation Tax has in effect two halves. The first half is concerned with the imputed tax credit which attaches to a qualifying distribution in the hands of a recipient. A qualifying distribution can be conveniently summarised as being a distribution which will give rise to an immediate or potential claim upon the disposable profits of the organisation. From this it follows immediately that a dividend is a qualifying distribution. A shareholder receiving a dividend, therefore, receives with it an imputed tax credit which can be used by him or her in the discharge of his or her personal tax liability.

In this Thesis it is the other half of this system of Corporation Tax which is of relevance. Companies are assessed to Corporation Tax on the basis of their agreed taxable profits. At the time of writing, the rate of Corporation Tax is 52% of taxable profits[1]. Under the system of taxation assessment and collection which exists in the U.K., a company

1. Recent evidence presented by Professor G.H. Lawson to NEDO indicates that: in terms of the ratio of tax cash-outflows to concurrent internally generated cash-flows, British manuafacturing industry has, in 1974/75, incurred a much higher tax burden --- in the case of several leading companies this has been in excess of 100%. The implications for the rate of taxation to be applied to project cash-flows are that the Chancellors declared annual rate of Corporation Tax is irrelevant. However, for want of more specific information, this argument is not pursued here.

will be liable to pay the Corporation Tax to which it has been assessed, between 9 and 21 months after the end of the accounting period to which the taxable profits relate. However, if a company makes a qualifying distribution, there arises to be paid an amount (related to the size of the qualifying distribution) in advance of the date at which the Corporation Tax would ordinarily be paid. This advance amount is known as Advanced Corporation Tax (ACT): it falls due to be paid within the calendar quarter next following the date upon which the qualifying distribution is actually made (not declared, but actually paid out). Thus, a company registered in the U.K. prior to 1964, and having an accounting year end at December 31st, and typically paying a dividend some six months after the end of the accounting year, would have to pay an advanced instalment (ACT) of the Corporation Tax liability due in respect of that accounting year, some nine months after the end of the accounting year, and the balance of Corporation Tax (termed Mainstream Corporation Tax, MCT) some 12 or 13 months after the end of the accounting year. Thus, ACT plus MCT sums to the total liability for Corporation Tax leading to the widely accepted argument that -- the higher the rate of ACT the lower is the rate of MCT, the former is offset against (is relieved by a reduction of) the latter. The extent of that relief is, however, limited. It is possible for unrelieved ACT to exist and thus for the effective rate of Corporation Tax to exceed the standard rate.

The requirement to pay an advanced amount of Corporation Tax must, therefore, represent a significant lien upon the cash-flow of an organisation at a time earlier than that which used to prevail. The situation is complicated by the constraints which are placed upon the extent to

which ACT can be effectively relieved by reducing the amount of Mainstream Corporation Tax which remains to be paid. Using simplified percentage rates for ease of illustration: the amount of ACT which can be off-set against the total Corporation Tax liability might be restricted to 35% of the total taxable profit of an organisation. At the same time, the amount of ACT to be paid in respect of a qualifying distribution might be 40% of that qualifying distribution (it is stressed that the amounts used here are for illustration purposes only). Thus, if a company had taxable profits of £100, and had made a qualifying distribution of £120, then the ACT falling to be due would be 40% of £120 = £48 ..... yet the amount which could be relieved by set-off against the Corporation Tax liability of £52 would be 35% of the taxable profits of £100 equal to £35. There would then be "unrelieved" or "excess" ACT of £(48-35) = £13[1].

Unrelieved ACT can be carried forward, carried back, or "transferred sideways" to other members within a group of companies, if the ACT arising in those other periods, or within those other companies, is less than that which would be allowable for set-off against Corporation Tax.

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1. No surprise should be occasioned by the payment of a dividend of £120 out of a taxable profit of £100. Other things being equal, the dividend is likely to be related to accounting profits rather than taxable profits: and because of the existence of substantial Capital Allowances, such as a 100% First Year Allowance, it is likely that accounting profits based upon non-accelerated depreciation rates may well be in excess of taxable profits.
A further complexity to be noted, however, is that the ACT of £48 would be set against the taxable profits of the year in which the qualifying distribution was paid -- not that to which it relates. Therefore, to determine the possibility of unrelieved ACT we ideally require to know the taxable profit of the year following that to which the dividend or qualifying distribution relates. This must be a matter of concern in the construction of taxation decision models, but it is not refered to further in this Thesis.

However, ordinary considerations of prudence dictate against the carrying forward of unrelieved ACT if future relief is thought to be uncertain[1]. Thus, the effective rate of Corporate Tax payable by a company is a function, not only of the current level of Corporation Tax, but also of the extent to which there does or does not exist irrecoverable unrelieved ACT.

This has important consequences for the appraisal of capital expenditure projects. The need to incorporate taxation cash-flows into such appraisal is undisputed. A capital expenditure project will, however, contribute towards the profits and cash-flows of an organisation and therefore (however indirectly) contribute towards the qualifying distribution policy of the organisation. If the policy is such as to give rise to unrelieved ACT (and it must not be forgotten that the very large Capital Allowances which will enure to the implementation of the project will, of itself, compound the problem by reducing the taxable profits of the organisation) then to what extent should the unrecoverable ACT be included in the cash-flows of the project? Inclusion could be by either writing in an explicit amount of ACT into project cash-flows, or it could be by increasing the rate of taxation applied to the appraisal from the normal 52% to the effective rate paid. Alternatively, it could be argued that the qualifying distribution policy of an organisation is a decision quite separate from that of the implementation of the individual capital expenditure proposal, and that therefore, on the principle of incrementality, appraisal of project should be in terms which relieve the project of any such unrelieved

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1. See paragraph 6 of SSAP No. 8, August 1974: Issued by the U.K. Accounting Standards Steering Committee.

ACT. (Indeed, a case can further be made to the effect that as ACT is -- whatever the intention -- a withholding tax which the recipient of a dividend takes into account in his valuation of the securities of the company; then the whole of the ACT portion of Corporation Tax, whether relieved or not, should be regarded as being part of the cost of equity and thus included in the hurdle rate used for the evaluation. The project would then be appraised at a taxation rate which is indicative only of the anticipated Mainstream Corporation Tax rate payable by the company. At the time of writing this is an unresolved argument. Obviously, it will have significant consequences for the selection of projects within an investment decision model).

A further important taxation issue, when considering project appraisal, arises out of overseas taxation. ACT is not available for the relief of overseas taxation in double taxation relief computations. It follows that if an organisation is in receipt of profits and cash-flow from an overseas subsidiary, out of which it declares a qualifying distribution such as a dividend, then the ACT arising on that dividend is not to be regarded as part of the U.K. Corporation Tax which can be set-off against local overseas taxation on those profits for the purposes of double taxation relief. On this account, earnings from overseas projects are disadvantaged in terms of effective taxation rates. Again the question must arise: should a project located overseas be appraised at a rate of taxation which includes this liability to unrelieved overseas taxation? Or, again, should the dividend policy which has given rise to such unrelieved overseas taxation be regarded as a decision which is independent of the individual project: and as such the project appraisal would be relieved of this extra burden of taxation.

Of necessity these issues are much simplified in this brief discussion[1]. There are other and more subtle problems associated with the determination of the quantity or rate of taxation to be ascribed to a capital expenditure project under the current system of U.K. taxation. Nevertheless, these two important problem areas will surfice to indicate clearly that, as never before, it is necessary to quantify, define and time cash-flows arising out of taxation in project evaluation and corporate financial planning.

5.5. PROJECT APPRAISAL AND THE IMPUTATION SYSTEM OF CORPORATE TAXATION

The previous section, which dealt briefly with some aspects of the modus operandi of the new tax regulations, provides the necessary framework to analyse the system's far reaching consequences for the capital budgeting procedures used by U.K. companies.

Before going on to discuss taxation as a specific subset of a comprehensive financial planning model it is extremely important to reconsider the increasingly complex rôle of taxation in project appraisal. It is possible to identify three broad areas where problems of a theoretical and practical nature are thought to occur as a result of the Imputation System.

1. WHEN DO PROJECT TAX CASH FLOWS ARISE?

The timing and level of taxation cash-flows, once dominated by Capital Allowances and the basic tax rate, are under the new system a substantially more complex function of ACT, MCT, Unrelieved Overseas Taxation, and Excess ACT.

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1. The interested reader is referred to CHOWN & NORMAN [34].

It is argued here that a principal axiom of capital budgeting is that the tax allowances and charges attributable to an asset should be allocated to the specific project which generated the taxation cash-flows. Thus, for example, an analyst would not apportion or in any way dilute the effect of a project's Capital Allowance among the other set of projects: this is because the incremental tax amounts are generally of sufficient magnitude (especially from a discounting point of view) that they will form a vital factor in assessing the worth of the project to the company. One could also argue that the project has been promoted and accepted because the tax cash-flows, which it alone generates, form a necessary segment of a more all-embracing taxation strategy; as may well be the case with projects that are leased or situated overseas. However, while this argument represents an ideal to which project analysts should aspire, the 'collective influence' of the project set up-on the Imputation System will generally make this goal difficult to achieve. It is currently very difficult, if not impossible, to determine what monetary amount to incorporate into the project's aggregate cash-flow in respect of taxation. This problem is further compounded by a similar inability to specify where in the project's life, and in what pattern, the taxation flows are likely to occur.

This is quite a serious predicament. It manifests itself in a basic inability to accurately forecast the company's amalgamated cash-flow profile into the future. The analyst is again confronted with a particularly difficult interdependency, or interactivity, which prevents the assessment of meaningful estimates of tax rates, or the timing of taxation flows, before the overall appraisal of the project set is undertaken.

Thus:

Until the final group of investments is selected and underway, the analyst cannot properly establish the appropriate tax figures to attribute to the individual projects. This is because the level of taxation that will ultimately result from these projects in a function of the 'collective influence' of those and previous projects (the composition of their aggregate cash-flow, the aggregate of their Capital Allowances, the dividend policy, the level of surplus ACT, the extent of unrelieved overseas taxation).

However, the selection of current capital investments, which will go on to form the final accepted set, is predicated on the knowledge of what their after-tax cash-flows will be. Unfortunately, this cash-flow series remains unknown until the optimal solution has been attained .. .. but to determine the optimal solution it is necessary to have a precise specification of a project's cash-flow! This interactivity has always existed, but never before to such an important extent. The crude approximations to taxation reality which have hitherto characterised project appraisal may no longer suffice.

2. WHAT RATE OF TAX SHOULD BE APPLIED TO PROJECT CASH-FLOWS?

It is conceivable that the appropriate rate of Corporation Tax applicable to an individual project will vary quite substantially throughout its life as the company's fortunes change and previous excesses or surpluses become relieved or new ones accrue[1]. It is equally possible

1. For example, see BUCKLEY [27 ,p168] who suggests that if surplus ACT exists a project could be exposed to three taxation rates over its lifetime: (i) The minimum mainstream corporation tax rate, (ii) The full tax rate (52%) and, (iii) The difference between the full tax rate and the rate of MCT. The exact timing of the change in applicable rates of taxation does, however, remain a substantial problem.

that the rate of taxation is, under the new regulations, indeterminate altogether ..... for the taxation analysis of a project must now incorporate, and attach new importance to, a whole range of factors which previously did not impinge so directly on taxation management:

1. The distribution policy of the company, the size of the dividend, and whether it is qualifying or non-qualifying.
2. The split of corporate profit between that generated in the U.K. and that earned overseas.
3. The existence of sufficient 'slack' within previous years tax accounts capable of relieving any excess ACT which is generated.
4. The delay experienced before surplus ACT may be set-off against future years taxation.
5. The amount of accumulated unrelieved taxation still waiting to be set-off against future profits.
6. The relative tax position and associated Capital Allowances created by other projects within the accepted set of investment ..... their 'collective influence'.
7. The physical location of the asset; whether it is based at home or abroad.
8. The amount of franked income received by the company.

5.6. A TAXATION DIMENSION TO THE INVESTMENT AND FINANCING DECISION INTERDEPENDENCY

The Imputation System demands a further degree of complexity if management is to solve (and hopefully optimise) the interdependency now argued to exist between the investment, financing and taxation decisions. There are three important interdependencies which are crucial to this

problem:

1. CAPITAL ALLOWANCES.

Most investment projects, with the exception of those that are leased, attract Capital Allowances which are designed to reduce the current taxation liability. Clearly, therefore, their rôle in the process of project selection, and their pervasive influence in taxation matters, is of prime importance.

Two groups of problems may be distinguished relating to the quantification and allocation of Capital Allowances, although in their effects these problems are inter-linked:

(i) Firstly, as discussed in the previous sections, there is the problem of determining the effective rate of taxation to be applied in evaluating the worth of the Allowance. If this cannot be satisfactorily ascertained then the cash-flow value of the Allowances to the company is indeterminate.

(ii) Secondly, there is the problem of excess Capital Allowances. The aggregated value of the accelerated Allowances, accruing to each one of a number of capital expenditure projects, may exceed the taxable profits of the company derived from on-going operations plus the set of newly accepted projects. The problem, therefore, is how to determine the effective rate of Capital Allowances for each individual project. And, if the effective rate is sufficiently lower than the nominal rate that marginal projects become unacceptable -- thus reducing the excess of Allowances and so increasing the effective rate -- then on what grounds is the improved effective rate to be re-applied to the marginal projects thereby resurrecting the original problem at

least in part? This loop seems capable of continued iteration as there can be no guarantee of a convergent sequence.

Hence, the value of a Capital Allowance -- which makes a significant impact on the discounted value of an investment project -- can be both difficult to assess and difficult to time. This must be a matter of serious concern to financial management in their evaluation of the capital budget.

2. THE DISTRIBUTION POLICY

The cost of equity is a constituent element of the company's weighted average cost of capital. If the cost of equity is some function of the company's share price, and the share price is some function of the dividend, then it follows that a company's distribution policy affects its cost of capital. In a non capital rationing situation the DCF hurdle rate is based upon the cost of capital thereby producing an interdependency between the distribution policy and the accepted projects.

As shown previously, the distribution policy can give rise to excess ACT (and Unrelieved Overseas Taxation) which, if present, will affect the taxation rate applied to the individual projects. Manipulation of the dividend policy in an attempt to compensate for this (by trying to minimise the tax liability for example) may affect the market's perception of the company's economic performance. The ultimate result of which will be a change in the company's cost of capital, leading to a new project appraisal rate.

3. OVERSEAS TAXATION

If a company is engaged in a significant number of profitable overseas investments while at the same time adopting a distribution policy which is incompatible with these earnings, then such an action may subject the company to the repercussions of Unrelieved Overseas Taxation and Surplus ACT; both of which will have to be carried forward until such time as they can be absorbed.

Applying the doctrine of 'collective influence' it would be argued that the resulting changes in the applicable tax rate should be equally endured by the home-based as well as the overseas-based investments. Alternatively, it could be argued that management consciously approved an overseas investment policy, the profits from which would be subject to the vagaries of taxation agreements and conditions in their respective countries. As such, it should be policy to isolate the effect of the overseas taxation burden and redirect any pecuniary disadvantage which arises solely to the foreign based investments.

The problem becomes one of balancing the influence of one group of projects against another purely on the basis of location, for example: if an unduly large proportion of overseas investments are elected to the optimal set of projects (pro-rata to the original balance of home and overseas projects presented for appraisal) then it will follow that a proportionally larger overseas tax liability will enure. As by the same token less U.K. based projects are being accepted the potential clearly exists to incur Unrelieved Overseas Taxation: in the form of inadequate double taxation relief -- a situation which may be made worse by the dividend policy of the organisation (ACT

on that dividend not being available for double taxation relief). This gives rise to a redistribution of the tax liability which may alter the project ranking and acceptability of certain investments.

5.7 AN INCIPIENT FRAMEWORK FOR THE INCLUSION OF CORPORATE TAXATION INTO AN INTEGRATED INVESTMENT AND FINANCING DECISION MODEL

I INTRODUCTION

The proposed system is suggested as a starting point for more advanced research on the important topic of incorporating realistic taxation policy and events into linear programming models. Because of the scope and complexity involved the model is not stated in mathematical equations. Instead, the concept is expressed as a flow diagram which hopefully is both homomorphic -- in that it mirrors the problem with sufficient accuracy -- and representative of the interdependencies that have been previously outlined between taxation and capital budgeting. There are two basic objectives connected with the modeling system under discussion:

firstly, to establish the most appropriate estimate of the company's taxation liability over the period covered by the model. This will enable the tax cash-flows (TCF) to be allocated to each individual project; and,

secondly, to determine the resulting after-tax cost of capital that will follow from the selection of the optimal set of projects, the associated corporate tax liability and the (presumed) variable tax rate throughout the period covered by the model.

Thus, the problems which are being synthesized into one overall procedure are:

1. It is impossible to establish the correct timing or rate of taxation until the corporate TCF profile has been established. The TCF profile is a function of the optimal set of projects. However, the optimal set of projects cannot be determined until the value of every individual project's after-tax cash-flow is known.
2. The basic hurdle rate for the model will be a function of the weighted average cost of capital. The after-tax cost of the debt element is a direct function of the corporate TCF profile.
3. The cost of equity is a function of the distribution policy; which, as one of its parameters, must take into account the tax consequences resulting from the adopted strategy. Those tax consequences involve, inter alia, the relationship of the ACT arising from the qualifying distribution and the taxable profits of the organisation. Yet, the taxable profit is largely determined by the level of capital investment undertaken and the manner in which it is financed.
4. Thus, until the optimal set of projects and the optimal set of financing instruments to be employed is known, it is impossible to establish the appropiate after-tax cash-flow stream for the company. And until this is known it is not possible to determine what the optimum dividend policy should be, and hence what the cost of equity is; nor is it possible to determine the tax rate to be used in calculating the after-tax cost of debt. Thus, because the appropriate hurdle rate cannot be established it is impossible to determine which projects will form the optimal set of investments.

The proposal about to be outlined, involves the consideration of a largely unexplored area of financial management: the triple integration of the investment, financing and taxation decisions.

It is assumed that at the 'core' of such a scheme is a joint I & F decision model of the type proposed by CHAMBERS [30]. To this system is added a sub-programme to calculate the taxation liability to fall due under the Imputation Tax regulations. The linear programming model would, in effect, call upon a taxation package to establish the appropriate "set" of tax cash-flows which would arise from the optimal solution to the two decision model.

It may be noted that leasing would be an important catalyst in such a procedure, as its adoption will affect all three of the decisions and would therefore be expected to contribute to, and extensively influence, the collective optimal solution.

II THE TRIPLE INTEGRATION MODEL

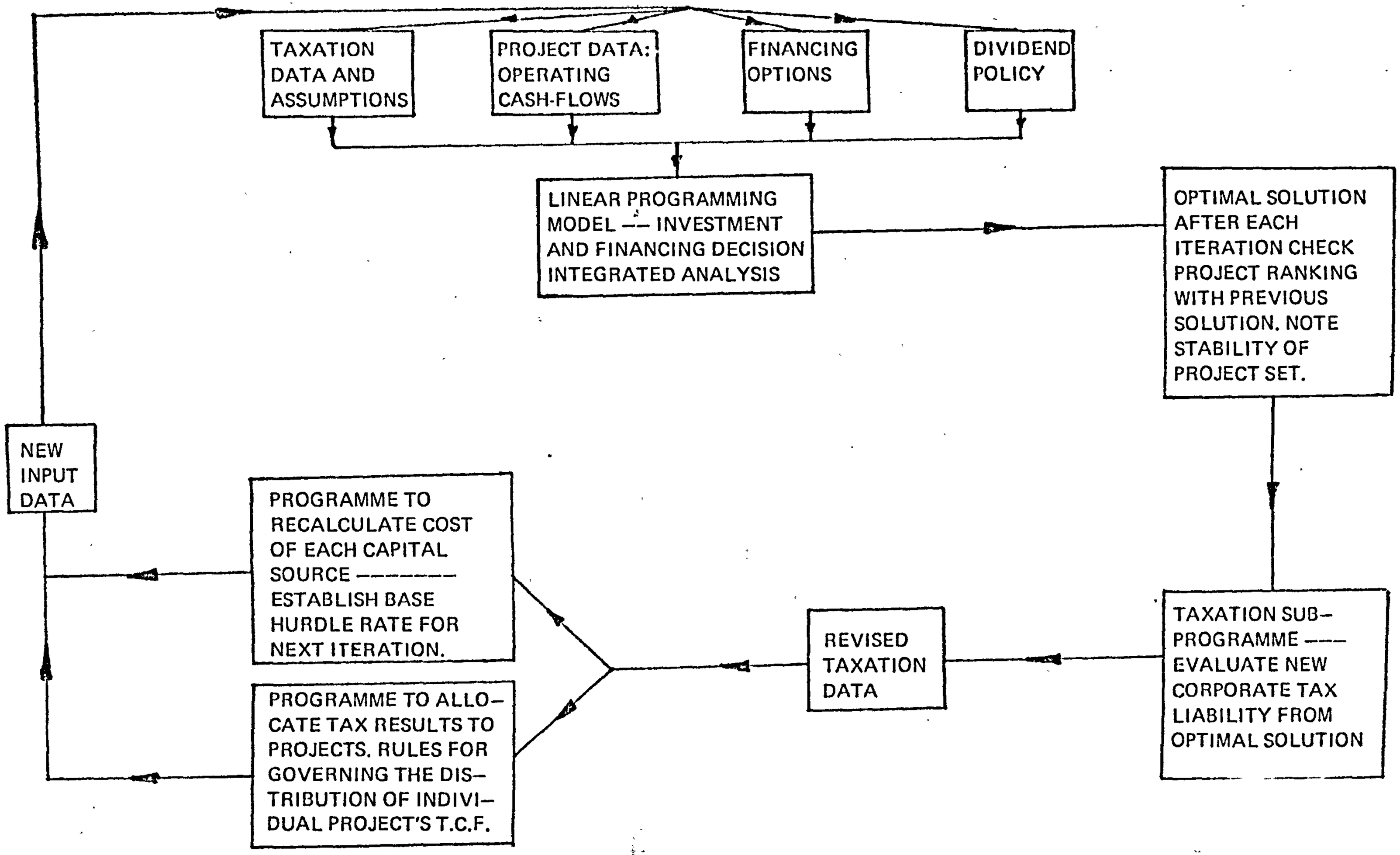
The sequence of events leading to the ultimate solution is shown diagrammatically on the following page; the iterative procedure may be explained as follows:

STAGE 1: The initial data base will comprise of the before-tax project cash-flows, the available financing options, and a first approximation to a dividend policy. Projects would be specified upto the horizon, as indeed would all the data. The taxation regulations and assumptions would be based upon one of the following policies which would depend upon managements present conception of future events:

1. The best estimate of the company's future taxation liabi-

FIGURE 5.2.

A FLOW DIAGRAM FOR THE PROPOSED TRIPLE INTEGRATED DECISION MODEL



lity extrapolated from the expected performance of current on-going projects (e.g. "Surplus ACT is not going to be relieved within the period; no Mainstream Corporation Tax is to be paid over the period in excess of the minimum rate, etc"); or

2. A base condition reflecting standard rates of taxation (that is; full tax rates, taxable profits expected throughout the period upto the horizon with no unrelieved overseas taxation or surplus ACT).

STAGE 2: Run the model to obtain the optimal solution under the initial data conditions. This will provide project ranking (and rejection) together with a list of financing options that are expected to be employed up to the horizon.

STAGE 3: Having established the group of projects to be undertaken in each of the years dealt with by the model, the data so obtained would be transferred to the taxation sub-programme in order to determine the first approximation to the corporate tax schedule. This will provide information of likely tax rates, liability schedules etc.; if any major problem areas are revealed then detailed analysis outside the model will be required (the information being processed by taxation specialists and senior management who may have to discuss a variety of policy matters, the most serious of which would concern dividend strategy and overseas investment).

STAGE 4: The revised data on the corporate T.C.F. will then be refined into two additional programmes which are designed to calculate: 1, the resulting cost of capital, and; 2, the allocation

of individual project's respective T.C.F.

STAGE 5: Having established the new hurdle rate and project after-tax cash-flow data, the cycle is repeated; adding, if necessary, any new dividend policy which may emanate from the specialist advice obtained at stage 3. It may also prove necessary to consider project starting dates, delaying or advancing the commencement of a project to gain a further advantage.

STAGE 6: The optimal solution is attained when the 'best' combination of investment and financing plans is obtained which simultaneously maximises the value of the firm and, by implication, smooths and minimises the taxation liability. This stage of the iterative process relies heavily on the specification of a 'triple' objective function. This, and other matters of equal importance to the model are discussed below.

III COMMENTS AND CRITISISMS OF THE MODEL

Of crucial importance to the proposed iterative routine is the allocation of taxation amounts to the individual projects at STAGE 4 of the cycle. Thus, with the exception of the less important standard tax rate case, management is responsible for stipulating detailed rules governing the distribution of taxation charges and allowances for the range of circumstances that may eventuate from the series of 'optimal' solutions (the programme will progress from 'local' optima after each cycle to the final 'global' optima, or the best obtainable solution). For example, management may decide that the taxation sub-programme should include the following guidelines or precepts (these suggestions are not argued to be in any sense superior to other alternatives covering the same problem): all projects based in foreign divisions of the company shall bear an equal burden of any unrelieved overseas taxation; and, those projects in progress when surplus ACT arises will be allocated the accumulated relief in taxation liability in the year when ACT is eventually relieved[1], new projects that have appeared in the interim will not be so relieved.

The formal establishment and adherence to such rules is likely to be a very delicate matter calling for impartial judgement as well as taxation expertise (because the enactment of such rules will cause projects to be given different priorities and ranking, such that divisional management - especially those overseas - may feel prejudiced against when they are informed of the taxation liability they are to bear). Despite the problems this may cause management, a set of rules will have

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1; See BUCKLEY [27]

to be constructed and applied irrespective of the use of modeling techniques.

An intrinsic feature of the programming huristics must be sufficient flexibility: it is important to allow for tactical changes of plan and the possibility that the forecasted project cash-flows will fail to be achieved, or perhaps even exceeded, thereby seriously affecting the concurrent taxation plans and policies. Excessive rigidity in such procedures is to be deliberately avoided because, as was shown in Chapter 1, tax regulations change with great frequency. Furthermore, as a matter of business practice, taxation strategy is often decided upon with great expediency at the last possible moment in the tax year when all the available data can be assimilated and last minute adjustments made to avoid incuring undue liabilities.

As may be imagined, the possible variety of outcomes from such an all-embracing model is going to be wide, frequently complex, and not necessarily internally consistent. This section will be concluded with a discussion on three points which are thought to represent serious conflicts inherent in any model which tries to integrate the investment, financing and taxation decisions:

1. THE CONCEPT OF COLLECTIVE INFLUENCE

At each iteration an investment and financing package will be obtained which can be used to establish the profile of taxation liabilities and rates which will be used in the subsequent cycle. It has previously been argued that, in taxation matters, projects can be said to exert a 'collective influence' -- a "pool" of taxation liability exists in which the liability caused by the first accepted project is indistinguishable

from the last accepted projects. To that end an <u>average</u> tax rate should be applied across each project and financing option: this seems a democratic methodology. However, it is in conflict with the mathematical reasoning used to select projects within the linear programme, viz: the dual (the <u>marginal</u> increase in the optimal solution caused by relaxing the constraint by one unit --- the project's worth may then be compared with its rivals to determine which investment yields the highest incremental return). As it is likely that the process will iterate around the loop several times there exists, in effect, a taxation dual which provides information on the marginal impact of a particular action: that is, the effect of undertaking another project, or increasing the percentage of a partially accepted project, upon the tax position of the company[1].

Thus, the model would be applying <u>general</u> taxation criteria to the set of projects while at the same time determining their acceptability, or value, by their <u>marginal</u> contribution. This incompatibility is recognised to 'weaken' the solution. However, management's choice is between the use of incremental taxation analysis of projects -- their marginal worth at the time they are elected to the optimal set, which is argued to be discriminatory -- or a decision to adopt the concept of 'collective influence' which must imply the use of uniform tax data and rates.

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1. The use of the term 'dual' is not entirely accurate in a mathematical sense if the taxation calculation is performed as part of a sub-programme of the L.P. In the current context it is meant to imply the marginal change in value (i.e. the increase or decrease in tax liability) brought about by a change in the investment set or financing set.

2. THE TAX STATUS OF REJECTED PROJECTS

A matter of further concern, from a methodological as well as a conceptual viewpoint, is the tax status of rejected projects after each iteration has taken place. This problem is believed to be unique to the triple integration model because rejected projects will be carried-over in each iteration. In the normal type of model (vide CHAMBERS) taxation is specified in advance so that the after-tax cash-flow data for each project remains unchanged. However, in the proposed system the accepted set of projects are allocated the company's entire expected tax liability: which, by implication, leaves the rejected projects in a state of taxation 'limbo'.

There seem to be two possible courses of action to bring the rejected projects back into the model:

1. Apply the resulting taxation rates to all projects undertaken irrespective of whether they have been accepted or rejected. While this would bestow an apparent amount of taxation on the total group of projects which is in excess of that to be paid, it is argued to be of no material consequence but merely a fictional devise to enable the iterative routine to proceed. All projects will then commence the next cycle with as impartial a tax cash-flow as may be allowed. Of course, this procedure may be inappropriate on occasions, especially if the solution is unusually volatile: the optimal set of projects changing quite dramatically from iteration to iteration as a result of 'spurious' taxation amounts being allocated to rejected projects. In general, however, it is to be assumed that a relatively stable solution will emerge as the model moves towards its optimal configuration. As such, the equitable treatment of rejected pro-

jects will only affect the aggregate liability modestly on each iteration (on the argument that a substantial proportion of the company's tax liability will originate from a central group of projects which will invariably form the core of the optimal set).

2. A two tier taxation system is to be adopted: the taxation amounts established in the sub-programme are distributed to the accepted set of projects; while a standard, full tax-rate, assumption is applied to the rejected group of projects. The obvious disadvantage of this approach is that it discriminates quite extensively against the rejected projects almost to the extent that they are thereafter so heavily encumbered with taxation as to be even more uncompetitive. As such, the first optimal set chosen will carry such a substantial advantage that other projects will have great difficulty countering their initial superiority --- the raison d'être of the integrated model will have been lost.

3. THE OBJECTIVE FUNCTION

Thus far the twin issues of the model's horizon and objective function have been avoided. The main reason for this (apart from the constraints of space and time in the Thesis) is the acknowledged fact that a fully integrated triple model (optimising the investment, financing and taxation decisions in one operation) can be expected to possess a very complex objective function. However, it may be noted here that there are three major problem areas which will require further study:

A. How is the objective function to be expressed? If taxation is to be included, is the goal to minimise the tax liability -- what is the trade-off between this objective and, say, the maximisation of the

horizon value of the company? Are, in fact, two objective functions needed: one for the investment and financing model; and one for the taxation sub-programme? Will they be in conflict? And can priorities be assigned between them if they are in conflict?

B. As was stated earlier in the Thesis, most models work towards (or have implicit within them) an horizon posture -- say a debt/equity ratio. Thus what taxation posture should be sought? What will this be based upon, and how will it affect the model's decisions in the pre-horizon periods? Can it be ensured that the investment and financing decision postures are compatible with the taxation posture?

C. How is the post-horizon taxation data to be expressed? Is it correct to endeavour to minimise the taxation liability of the expected T.C. F's? Is it possible to match a tax minimisation objective with a discounted cash-flow maximisation objective? What is a valid discount rate to discount taxation liabilities?

IV SUMMARY

To sum up the arguments which have been raised concerning taxation models, it may be noted that: 1, the state of the art is very much in its infancy; 2, the interdependencies between all three decisions are of great practical importance and should not be ignored because they are difficult to model; 3, the first steps in an iterative procedure to work towards an optimal solution have been outlined; and 4, a great many problems have been specified which will be encountered before a workable model is produced.

5.8 CONCLUSION

The problem of 'discriminatory financing' is a most serious one in the analysis of a lease and, as will be made clear in the following Chapter, it pervades many of the suggested procedures for solving the leasing decision. It has been repeatedly argued in this Thesis that projects must be appraised by a common criterion if an equitable comparison is to ensue: this is particularly crucial in the case of a specific financing option linked to an investment project. The Valve Additivity Principle runs counter to this argument but, as was demonstrated in conditions other than a perfect capital market, it fails to consider the important interdependencies which can only be satisfactorily considered in a simultaneous I. & F. decision procedure. If these interdependencies are acknowledged to exist then the VAP no longer holds and it is incorrect and non-optimal to appraise projects by their individual cost of finance discount rate.

Significant attempts are being made to cope with the interdependencies which exist in financial management by way of integrated decision models using linear programming techniques. On balance the CHAMBERS model, and others of a similar status, have made some progress -- notably in the area of a linkage-cognizant decision criterion -- but major issues such as the horizon problem and the BAUMOL and QUANDT contradiction have yet to be satisfactorily solved. The widespread use of such techniques in practice is someway off, but there is a discernible increase in their use and as such a great deal more research is needed not only on the mathematical structure of the problem but also into the more pragmatic issues of data specification, horizon valuation and realistic financing options.

Of increasing relevance to project appraisal, lease evaluation, and mathematical models is the issue of corporate taxation. Project analysts can no longer make sweeping assumptions about the rate and timing of taxation liabilities. The Imputation System has further complicated an already complex and neglected aspect of financial management. Several important 'taxation interdependencies' were considered which led to the conclusion that any realistic attempt to establish the correct corporate tax cash-flow profile must involve a triple integrated model of the investment, financing and taxation decision. Such a model is of enormous scope and complexity. It raises issues which relate specifically to the leasing decision, or any project appraisal, and evokes innumerable questions as to methodology. A basic framwork was established in an effort to structure the problem in a manner which would stimulate further research.

CHAPTER 6

THE LEASING DECISION : A REVIEW OF THE LITERATURE

6.1 INTRODUCTION

In this Chapter attention is turned to the various academic works in financial theory which relate to the leasing decision. It has been estimated by the researcher[1] that during the period 1960 to the present day, between 150 and 200 articles have been written which concentrate primarily upon the quantitative analysis of a lease. Needless to say, therefore, with such a proliferation of opinions and techniques any resumé requires considerable editorial judgement as to which papers are to be considered as the most important contributions to the subject. As will become clear in the discussion which follows, the leasing controversy involves a series of debates and arguments which are conducted on several fronts. Among these issues are :

(i) Is the leasing decision a "lease-or-buy" or "lease-or-borrow" comparison?

(ii) What is the correct hurdle rate to apply to the decision : the corporate debt rate, the risk free rate, the marginal efficiency of capital, the weighted average cost of capital, or the borrowing opportunity rate?

(iii) What account should be taken of the different borrowing patterns made available by alternative lease contracts?

(iv) What method should be used to account for the different levels of uncertainty inherent in the various cash-flow elements which are present in the analysis?

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1. See TERRY [130]

(v) Should the implicit interest of the lease repayments be included or excluded from the cash-flow series?

(vi) Is the leasing decision a financing decision, an investment decision, or a simultaneous decision?

A study of the Literature of lease evaluation will reveal pronounced divergences of opinion amongst the various writers (arguably one of the most controversial and unresolved issues in financial theory); but none so striking as the debate on the appropriate discount rate(s) to apply to the analysis. As a precursor to the ensuing discussion it is perhaps worthwhile to tabulate the remarkable discord in academic opinion over the past twenty years on this matter : as is made clear, no consensus has emerged -- indeed, quite the contrary.[1]

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1. It is salutary to reflect that this has undoubtedly contributed to the confusion which prevails throughout U.K. industry on the topic of lease evaluation. See the report of the industrial field work in Chapter 7.

TABLE 6.1

A SAMPLE OF HURDLE RATES USED IN THE LEASING DECISION

INTERNAL RATE OF RETURN	DEBT RATE + AVERAGE COST OF CAPITAL
McEACHRON [92], 1961	GANT [58], 1961
MERRET & SYKES [98], 1963	VANCIL [135], 1963
BEECHY [14], 1969	FERRARA [51], 1966
MITCHELL [99], 1970	BOWER,HERRINGER & WILLIAMSON [20] 1966
DOENGES [38], 1971	MAO [93], 1969
ROENFELD & OSTERYOUNG [117] 1974	JOHNSON & LEWELLEN [79], 1972
FINDLAY [55], 1975	SARTORIS & PAUL [118], 1973
EQUITY RATE	**MULTIPLE RATES**
BLOOMFIELD & MA [19], 1974	GORDON [61], 1974
	MYERS [106], 1974
WEIGHTED AVERAGE COST OF CAPITAL	SCHALL [120], 1974
KELLER & PETERSEN [81], 1974	
FAWTHROP & TERRY [49], 1976	

Another significant problem which confronts the writers on lease appraisal is whether the correct comparison is a "lease-or-buy" or "lease-or-borrow" decision. Majority opinion on this issue tends to favour the latter, although there is a notable body of opinion to the contrary as will be seen later.

The proposal that the borrow-vs-borrow decision is correct necessarily implies that borrow-vs-equity is invalid as a comparison. One defence of this proposition relies upon the argument that the financing of projects must be undertaken in the

context of a fixed debt ratio which corresponds to the optimal capital structure. It would follow therefore, that the lease-vs-equity analysis is fallacious because, as the debt-equity ratio is pre-set, these two forms of finance can never substitute for each other. The only valid comparison is between different forms of debt which compete for a share of the total debt allocation within the prescribed ratio. If the ratio is currently at its upper limit then any introduction of incremental debt (say leasing) would imply a <u>trespass</u> of the debt-equity boundary. In consequence, the lease analysis should be charged a penalty cost for this infringement of the optimal capital structure.

As will be observed in the ensuing discussion this viewpoint is extensively favoured in the literature, but arguably it leaves several significant questions unanswered. Consider, firstly, the circumstances which surround the leasing decision. It could be argued that the lease-vs-borrow comparison depends upon the use of leasing as "last resort financing" -- which would clearly imply that no equity finance exists to form the other half of the comparison. However, an equally valid question is whether any other <u>borrowing capacity</u> exists in these circumstances, and whether <u>in fact</u> a borrow-vs-borrow analysis is possible. Resolution of this essentially empirical issue is delayed until Chapter 7 when various leasing strategies will be considered. Nevertheless, the existence of a pure lease-vs-lease appraisal is a possibility ignored by many writers.[1]

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1. Other than those who favour an IRR analysis of a lease contract, but invariably this technique is based upon a desire to establish the implicit yield of the contract and not a conscious rejection of the underpinning logic of the lease-or-borrow methods.

Another possible defence of a lease-vs-borrow analysis is rooted in the axiom of capital budgeting that "like must be compared with like." However, as stated, this maxim lacks completeness or rigour : for it may be asked, which likeness is relevant? Is it simply a specific category of finance? Or is it the economic entity of finance as a whole? The issue rests upon whether it is more correct to compare debt instruments or financing instruments. This is the quintessence of the managerial dichotomy : lease-vs-equity. It will be observed in this review of the literature that the concentration of extant thought and discussion tends towards the comparison of debt alternatives only. These arguments will be considered, and where appropriate criticised, in the ensuing discussion; although it will not be possible satisfactorily to resolve these problems until the results of the Industrial Survey have been presented and the lease evaluation procedures which emanate from it duly proposed and examined in later Chapters.[1]

Finally, the reader is asked to note that all the nomenclature in this Chapter has been standardised into a uniform group of symbols. As such, all the equations and relevant quotes have been modified and converted from the originals to provide consistency and, hopefully, easier comparison of the various models discussed.

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1. See Chapter 7.2 II, and Chapter 9.4 IV.

STANDARDISED NOMENCLATURE -- FOR LEASING LITERATURE REVIEW

A_t = Implicit Interest in Equivalent Loan Payment (S_t) in period t.

D_t = Depreciation of Asset if owned, in period t.

d = After-Tax Borrowing Rate (Debt Rate or Borrowing Opportunity Rate)

F_t = Incremental Revenues minus incremental operating Costs generated by Asset in period t.

i = Before-Tax Lease Rate.

j = Risk Free Interest Rate.

K = After-Tax Weighted Average Cost of Capital

k_e = Cost of Equity Capital

L_t = Lease Payments in period t.

M_o = Present Value of Equivalent Loan at Borrowing Rate (d)

N_t = Implicit Principal in Equivalent Loan Payment (S_t) in period t

N = Life of Lease Contract, in years

n = Life of Asset, in years.

O_t = Incremental cash outlays assumed by Lessor but incurred by Lessee if Asset is purchased, in period t.

P = Price of Asset at period t = o

S_t = Equivalent Loan Payment in period t ($S_t = A_t + N_t$)

T = Corporation Tax Rate

t = Time Period

R = Residual Value of Asset, Appropriately Adjusted for Tax, at period N

r = After-Tax Lease Rate

α = Certainty Equivalent Coefficient.

II. A REVIEW OF THE LEASING LITERATURE : NPV MODELS

The work of VANCIL [132, 133, 134 & 135]has, in the writer's opinion, been one of the most significant contributions to the quantitative analysis of a lease and some of the problems it poses. Although VANCIL is criticised by contemporary writers on leasing, there can be little doubt that his early research laid the foundations upon which much of the later writings were based.

A great many texts on financial theory and management give some support to VANCIL'S views and methods of analysis, from which it may be concluded that they have found wide acceptance.[1] There is also a series of articles by FERRARA [51, 52, 53 & 54] which gives direct support to VANCIL'S argument. Clearly, therefore, this review of the literature should commence with a critical examination of VANCIL'S lease appraisal model and develop chronologically through the various amendments in lease appraisal methodology which have been proposed between 1961 and the time of writing this Thesis.

VANCIL establishes his framework for discussion by recommending that the investment and financing decision should be conducted separately :

> "The first step in the analysis of a financial lease is to compare the alternative of purchasing the equipment with the alternative of continuing the status quo, another 'routine' investment decision. If the status quo appears

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1. See, for example, MAO [93], MERRET & SYKES [98], VAN HORNE [138], and WESTON & BRIGHAM [144].

to be a better alternative than purchase of the equipment, then it is unlikely that, if properly analysed, the alternative of acquiring the equipment on a financial lease will be more attractive than the status quo.

Thus the consideration of a financial lease should begin only after a company has previously decided that the purchase of a piece of equipment is desirable. Having made this decision, the company may be faced with several alternative methods of financing the acquisition; purchase for cash, purchase on an instalment plan or some other method involving debt financing, or acquisition via financial lease. "

VANCIL [135, p93]

VANCIL indicates that a previous analysis must be undertaken before a decision is made on how the asset is to be financed. This analysis would take the form of an economic appraisal of the associated investment decision and, if the result indicated a 'go' decision, then the next stage is considered -- namely, in VANCIL'S case, a "lease or borrow" analysis.[1]

It has repeatedly been argued in this Thesis that it is erroneous to separate the I & F decisions because of the critical

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1. The literature is replete with this procedure. MAO [93,p332] is a good example : "Suppose a firm decides that the purchase of a certain asset is desirable but prefers not to finance the acquisition solely with equity funds." There is an unfortunate illogicality in this often seen statement, in that the circumstances which led financial management not to finance with equity is, in its own right, a financial decision -- the analysis of which is never elucidated. Other writers whose models are subject to the same criticism are : BEECHY [14], BLOOMFIELD & MA [19]; BOWER, HERRINGER & WILLIAMSON [20]; GANT [58]; MAO [93]; MERRET & SYKES [98]; ROENFELD & OSTERYOUNG [117]: SCHALL [120]; and WESTON & BRIGHAM [144].

interdependencies that exist between the two : an integrated decision is essential in the case of leasing as BOWER rightly acknowledges :

> "They take leasing as a decision to be made given predetermined financing and investment policies, rather than as a decision to be made jointly as part of a determination of these policies. ..... Anything less than a joint analysis of the optimal mix (of I & F decisions) must limit the (leasing) decision to an approximation of the ideal. "
>
> BOWER [153, pp25/6]

Thus, VANCIL'S analysis is argued to be fundamentally incorrect in separating the I & F decisions. The belief that the leasing decision is purely a financing one is rooted in VANCIL'S conviction that a company has a pre-determinable, stable and optimal debt-equity ratio towards which it should strive.[1]

> "Management, acting for its stockholders, determines the capital structure through the strategic financing decisions which it makes. If the capital structure is altered radically, say from one involving a small amount of debt to one that is highly leveraged, stockholders who desire to run only a minimal risk will sell their stock and reinvest in a company that has the type of structure they prefer. Management can best fulfil its obligations to its stockholders <u>by establishing a policy with regard to a company's capital structure and adhering to that policy consistently over relatively long periods of time</u>. "
>
> VANCIL [135, p92] emphasis supplied

1. This argument was strongly supported by GANT [58 & 59].

The MODIGLIANI and MILLER nature of this argument is striking. Arguably, this is the nucleus of VANCIL'S lease appraisal philosophy because it discloses the mainstay of the author's reasoning for eventually penalising any debt instrument which disturbs or exceeds the sacrosanct debt-equity boundary. VANCIL'S rationale in support of this conceptual framework is based upon a company's "pool of funds" --- which comprises of all the internal sources of funds plus a definable sum of as yet unused debt capacity made available by stretching the company's debt-equity ratio to some pre-conceived limit. The extent of this incremental debt is likely to be small as a company should anyway be operating close to its most efficient ratio (in accordance with the quote above).

The "pool of funds" faces a "pool of projects" --- which consists of all the possible investments available to the company at the time of the analysis. If the "pool of funds" is constrained in its growth by the rate of equity funding, as implied by a fixed debt-equity ratio, then the financing decision has in-part already been made and largely all that is left to perform is the investment decision.[1] How then does the analyst evaluate a lease, coming as it does with its own financial package, and is it conceptually acceptable to allocate that part of the "pool of funds" to an individual project?

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1. FERRARA notes : "One doesn't ordinarily consider financing until there are worthy investment projects" [51,p111]. However, as previously indicated : in the lease analysis proposed by VANCIL the investment decision has already been undertaken -- making both the I & F decisions predetermined at the commencement of the appraisal. This is an underlying confusion in the VANCIL technique.

VANCIL argues that there is no "non-arbitrary" method of associating individual investments with individual sources of funds. As debt is generally raised "on the back of equity" it cannot be said to relate to any particular project because without the equity base, acting as a form of collateral or surety, the supplier of debt would not risk his capital. Monies within the company cannot be divided into specific segments of finance, their sources and costs aggregate into a single supply at a weighted average cost. Therefore, a project which attracts its own finance should not receive preferential analysis or consideration by virtue of its (say) "cheapness" of financing in relation to other projects. It must be evaluated using a standard hurdle rate determined by the weighted average cost of capital derived from a pre-set debt equity ratio.[1]

VANCIL still perceives a problem however. If a lease has been undertaken, then the company has transgressed its own debt limit and (in his view) will thereby incur an extra financing cost because thereby extra debt financing is obtained.

In order to compare existing debt (or incrementally raised debt) with a new lease, this EXCESS DEBT FACILITY must be somehow "washed out" of the calculation to ensure a "like-with-like" comparison. This is done by means of a screening device known as the "Borrowing Opportunity Rate" of interest. Debt raised at this cost is considered correct within the scope of the company's debt facility, debt raised outside this level, in the form of a

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1. This lucid presentation of the argument against "discriminatory financing" is one of VANCIL'S primary contributions to financial theory.

lease, must incur a penalty. The core of VANCIL'S argument is that :

> "In order to get a valid comparison between a financial lease and direct debt, we must first recognise that a certain amount of each lease payment is for ordinary interest expenses which the company would have to pay on any type of loan. The amount of this imputed interest is measured by the company's "borrowing opportunity rate" and these unavoidable interest charges are eliminated from the calculation. "
>
> VANCIL [135, p125]

Implicit in VANCIL'S argument is the unsubstantiated assertion that a lease will always bear a higher implicit interest charge than a direct debt instrument. This high cost of leasing is alleged to result from the company exceeding its pre-determined debt limit.[1] Debt exercised below that limit carries a standard interest charge : the borrowing opportunity rate, see VANCIL [135, pp101-104] .

> "For our purposes, we shall merely define a corporation's borrowing opportunity rate as the <u>minimum</u> rate that a company would have to pay today in order to secure a given amount of unrestricted funds from the issuance of the most attractive type of securities (from the lenders point of view) that the company is in a position to sell. This is a market-determined rate and reflects primarily the overall cost of money in the economy at a given point in time and the lender's appraisal of the credit-worthyness of the borrower."
>
> VANCIL [135, p38]

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1. See VANCIL [135, p23].

VANCIL suggests that a borrowing rate be established in order to evaluate and assess the relative merits of the competing lease agreement. It is argued, however, that this proposal represents the intrusion of a totally artificial assumption and an artificial debt presence into the appraisal. Furthermore, this situation may differ significantly from the actual circumstances pertaining at the moment of the leasing decision. For example : does the borrowing rate ever equal the implicit interest rate charged on the lease? Why should a non-existent debt alternative be compared with a lease? In a later Chapter of this Thesis, when the concept of a "spill-over" leasing strategy is introduced, it will be noted that by definition the borrowing rate must equal the "spill-over" leasing rate because in these circumstances this is the only effective debt instrument available to the company.[1]

Concern with the "excess debt facility" which leasing may introduce into the capital structure prompts VANCIL to "strip-out" of the lease cash-flow the basic interest rate which would be charged on an assumed loan at an assumed borrowing rate. By implication this leaves a residue in the lease calculation of any excess interest which the more expensive lease may carry : in essence this means that the lease will carry a penalty cost viz-a-viz debt.

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1. Within the context of the previous discussion on LINKAGE-LEASING and borrowing capacity it would seem to follow that "spill-over" can be construed as "stepping-over" optimally exploited borrowing capacity and effectively eating into contingency cash-flow reserves. (It should also be noted that there is inherent in any discussion of this nature the problem of perceptions : if management believes that borrowing capacity is optimally exploited it must be implicitly believing that the borrowing rate equals the spill-over rate). In truth, the borrowing rate may well be below the spill-over rate. The issue now becomes philosophical -- should the analysis be conducted on perceptions or truth? See the earlier note on subjective judgements as to whether leasing at the margin is "planned financing mix" or "spill-over" : Chapter 4.6, IV, page 183.

This procedure for lease evaluation is both unclear and not always in accord with observed business practices, in that :

firstly, it unwarrantedly penalises a lease for introducing an "excess debt facility" into the company beyond the artificially erected,inflexible debt limit -- this contradicts the arguments on the optimal exploitation of debt capacity previously discussed in Chapter 4, when the judicious use of "excess" debt (particularly leasing) was shown to make a significant contribution to the growth and profitability of an organisation;

secondly, it ignores the multiplicity and complexity of debt financing operations which exist in practice and which could provide any number of interest rate structures to be used in establishing the company's borrowing opportunity rate;

thirdly, it assumes that companies have a debt option available to them at the time of the leasing decision (which they may not always have, see Chapter 7) and that it can be tailored to mirror the leasing contract; and,

fourthly, by "washing out" only a portion of the implicit interest inherent in the lease repayment it follows that some remnant of interest charges will perforce remain in the cash-flow series which, it has repeatedly been argued, constitutes a double counting of the same cash-flow.[1]

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1. Thus, VANCIL is in error when he notes: "The reason that our (lease or borrow) calculation is directly comparable ... is that no financing charges are included in either figure." [135,p102]. It will be shown in Chapter 9 that all the interest within the repayment schedule should be removed from the cash-flow series to achieve this objective.

VANCIL argues that the amount of debt capacity allocated to a project in each period should not be permitted to affect the apparent profitability of the investment. How then, VANCIL asks, is a company to compare debt sources which have different repayment profiles? For, if the repayment profiles differ then varying amounts of debt would be outstanding during the life of the two debt contracts -- which VANCIL argues would not create a like-with-like comparison of the financial alternatives.

To resolve this problem VANCIL notes that if the investment decision implies that a project's initial cost is paid out at the commencement of the project, then the price of the leased asset can be assumed to utilise an amount of debt capacity, in year one, equivalent to its original cost.[1] The lease must then be compared with a similar loan which has a "like-for-like" repayment schedule : in this way the analysis :

> " .. gives proper recognition to income tax differences but .. not .. the amount of financing provided by a given plan. "
>
> VANCIL [133, p132]

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1. The exact specification of this 'equivalent loan' has been debated vigorously in the literature and will be discussed in the remainder of this Chapter. BOWER notes of some of the writers who have considered the problem : "Although BOWER, HERRINGER and WILLIAMSON [20 and VANCIL [135] calculate the cost of borrowing sacrificed or the value of the Lessor's claim against the company in the same way as FINDLAY [55] and others do, they presume that the borrowing that would take place if leasing were rejected would be equal to the purchase price of the asset. As a result they calculate their interest tax shelter from an equivalent loan equal to the purchase price of the asset rather than equal to the present value of the lease payments. ... difficulties may arise where the purchase price is above the present value of lease payments, so additional borrowing, if it occurs, could threaten debt limits and affect discount rates." [153, pp30/31].

"In order to evaluate lease financing it is necessary to measure (i) the cost disadvantage of leasing due to its higher interest rate and (ii) the cost advantage of leasing due to more favourable tax treatment and the avoidance of certain costs transferred to the Lessor."

VANCIL [135, p34]

VANCIL'S methodology is not made explicit in equation form (which could account for some of the unjustified criticism of his method by writers who incorrectly specify his algorithm : viz. SARTORIS & PAUL [118,p47]and ROENFELD & OSTERYOUNG [117,p75]. It is shown below to facilitate further discussion and comparison with later models. Thus VANCIL advocates the use of the following analysis when evaluating the "lease-or-borrow" decision. VANCIL [135,pp96-112].

$$NPV(B) = P - \sum_{t=o}^{N} \frac{T.D_t}{(1+K)^t}$$

$$NPV(L) = \sum_{t=o}^{N} \frac{L_t}{(1+d)^t} - \sum_{t=o}^{N} \frac{(L_t - A_t).T}{(1+K)^t}$$

The net present value cost of borrowing shows the cost of the asset less the tax shield created by the asset's depreciation schedule (Capital Allowances). The net present value cost of leasing comprises of the lease payments -- discounted at the company's debt rate, or borrowing opportunity rate -- and the tax deductability of the lease payments less the tax shield of interest payments foregone on the equivalent loan. This last term "credits the lease with a tax saving only to the extent that it exceeds the tax saving on the interest charges that would be payable on a

matching loan, " JOHNSON & LEWELLEN [79,p817]. Or as VANCIL notes : "Financing plans which charge an interest rate higher than the borrowing opportunity rate are penalised in the analysis to the extent of the incremental cost of the higher interest charges " [135,p101].

Consider now some of the criticisms leveled at VANCIL'S model. Firstly, and without doubt the most cited stricture[1], is an inconsistency in the discounting of tax shelter. As JOHNSON & LEWELLEN note : "Whereas (Bower, Herringer & Williamson [20])and VANCIL discount lease payments at the corporation's debt rate, they discount the tax savings on the payments at the firm's cost of capital. We would maintain that the tax deductions occasioned by such outlays are as certain as the outlays themselves and would reject the notion of applying different capitalisation rates to the two elements." [79,p818]. There is a fallacy in this conclusion, although its disclosure is not intended to sanction the discounting of lease payments at the cost of debt. It was extensively argued in Chapter 5 that the rate and incidence of taxation is a function of the total I & F decisions of the organisation. As such, an interdependency exists between the performance of those decisions and the residual tax shields they give rise to : see Chapter 5, section 5.4. Logically, therefore, the certainty and predictability of taxation cash-flows are even more doubtful and precarious than normal I & F cash-flows -- and not, as JOHNSON & LEWELLEN et.al. state, easier to predict, [79,p820] --

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1. See ROENFELD & OSTERYOUNG [117,p75]: JOHNSON & LEWELLEN [79,p818]: BEECHY [14,p377]: SCHALL [120,p1211]: & SARTORIS & PAUL[118,p48].

clearly, therefore, a case could be made for using a higher discount rate than the cost of debt.

The second issue upon which writers are irreconciled, is a fundamental one : that of a "lease-or-borrow" or "lease-or-buy" decision? This altercation in the literature will be discussed at various periods throughout this Chapter. However, one point is worth making which seems to have been overlooked by other researchers of VANCIL'S model. It will be noted that VANCIL'S algorithm relating to the debt alternative, only deducts $D_t.T$ from the cost of the asset, "since depreciation is the only deductable expense under ownership." Clearly this is not the case, as interest repayments on debt are legitimate deductions. Arguably, VANCIL'S algorithm is, although it is never stated, a comparison with pure equity financing since no interest deductions would then apply to the equation. Thus, the "borrow" alternative is suspiciously like purchase via equity.

Thirdly, ROENFELD & OSTERYOUNG note : "Another problem with VANCIL'S lease model is that the lease cost is sensitive to the borrowers interest rates. That is, the lease cost will vary depending upon available sources of funds and on the firms ability to bargain for long-term debt. This sensitivity is unrealistic since the cost of leasing is normally fixed by the Lessor and there is no interaction between the lease cost and alternative interest rates." [117,p75]. When discussing interdependencies in Chapter 4.3 it was argued that the cost of one financing source can and does influence the cost of other

capital issues, however, it is thought that ROENFELD & OSTERYOUNG'S basic argument is correct in that empirical evidence suggests that the quotation offered by the Lessor would rarely, if ever, be significantly affected by the cost of capital to the company (see reply QL11, Chapter 7)[1]. Furthermore, it is worth noting that advocates of VANCIL'S method of lease appraisal never suggest that <u>all financing decisions</u> should be gauged against the yardstick of a standardised borrowing opportunity rate.

Fourthly, and in anticipation of some of the issues to be considered later in this review, MYERS notes that the general lease evaluation procedure (viz. VANCIL) embodies several assumptions not generally recognised.

> "1. It assumes the MODIGLIANI-MILLER [101] view that the only advantage of debt financing is the tax savings generated by the deductibility of interest from taxable income.[2]

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1. Since the above was written there has developed within the U.K. the practice known as "Variable Interest Rate Leasing." The Lessee is asked to stipulate the rate of interest to be written into the lease, bearing in mind sharp fluctuations upwards in medium-term interest rates as corrective action is taken against the pressures of sterling. Periodically, the Lessor extends a rebate or makes a surcharge according to the extent to which the Lessor has over or understated increases in interest rates. Clearly the Lessee does not have an unfetted choice of interest rate, but the first impressions of the few leasing companies so far operating this system is that Lessees do relate their choice to their perceptions of their existing cost of capital.
   It will not escape the reader that one important result of this development is that leasing payments lose their contractual certainty which is advanced by many writers as the grounds for discounting the lease payments (or its tax shield content)at a risk-free or risk-reduced rate of interest.

2. See page 272,fn 1, where MYERS argues in favour of an additional "linkage" dual associated with debt capacity being added to the cash-flow series : what MYERS terms the "Adjusted Present Value."

2. It assumes dividend policy is irrelevant, again in the MODIGLIANI-MILLER sense, and therefore excludes transaction costs. It excludes capital rationing a fortiori.
3. It assumes that the "risk-independence" or "value additivity" principle holds.[1]"

MYERS [106,p3].

The problem of capital rationing and the leasing decision has previously been considered in Chapter 4.4 & 4.5, when the significant interdependency between the introduction of new funds into the I & F decision and the criterion hurdle rate demonstrated that the use of a cost of capital hurdle rate was suspect, and that a more appropriate criterion was the investment opportunity rate. However, see Chapter 9, section 9.6, and FAWTHROP & TERRY [49,pp91/94] for further discussion of this issue.

In an attempt to overcome the deficiencies of the VANCIL proposal, BOWER, HERRINGER & WILLIAMSON [20], (hereafter BHW), suggest a model which quantified the operating and financial advantages or disadvantages present in the lease-loan choice. The operating advantage is measured by discounting the company's "basic cash-flow" at the weighted average cost of capital, whereas the financial advantage inherent in the debt alternatives is measured by discounting the lease-loan cash-flows at the "capitalisation rate which applies to debt." Like VANCIL, BHW suggest equivalent loan payments in order to effect a correct comparison of the alternatives.

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1. See HALEY & SCHALL [68], Chapter 5.2 II; and SCHALL [120] reviewed below.

" .... a lease payment schedule of any configuration can be matched by a loan or series of loans with the same configuration. Therefore, the loan we take to be alternative to, or equivalent to, the lease has payments proportional to the lease payments in each period; the proportion is equal to the purchase price of the asset (the loan required) divided by the capitalised value of the lease. "

BOWER, HERRINGER & WILLIAMSON [20,p260].

The same objections can be levied against the equivalent loan approach as were set against VANCIL'S use of a borrowing opportunity rate (see page 323). The equivalent loan assumption pre-supposes both the willingness of management to take up a funded loan and its availability to management. This may be the case in the U.S.A. economy, but the absence of equivalent asset-loan facilities is a noticable feature of the contemporary U.K. financing scene. This is especially the more so if the lease is "tailored" in the manner described earlier in the Thesis. And yet, the absolute equivalence of the conceptual loan is the essence of this approach. In some ways the equivalent loan analysis is of the same logical precision, but observable unreality, of the MM argument. If one accepts such MM assumptions as an identity of corporate and individual risk costs, or the ability to conduct arbitraging transactions without brokerage fees etc. then the logic of the MM argument is inescapable -- but it does not make it any the more acceptable in real life. The same is true of the equivalent loan approach to the problem of lease analysis.

Newly introduced into the basic lease-vs-borrow algorithm of BHW, is the inclusion of a salvage value term (R_N) and a recognition

of the various costs incurred by the Lessor when the asset is leased but assumed by the Lessee when purchased (O_t).[1] The BHW model may be stated thus:

$$NPV(B) = P - \sum_{t=1}^{N} \frac{(A_t - D_t).T}{(1+K)^t}$$

$$NPV(L) = \sum_{t=1}^{N} \frac{L_t}{(1+d)^t} - \sum_{t=1}^{N} \frac{L_t.T}{(1+K)^t} - \sum_{t=1}^{N} \frac{O_t(1-T)}{(1+K)^t} - \frac{R_N}{(1+K)^N}$$

Several writers[2] comment that the BHW model is identical with the VANCIL algorithm (assuming that R_N & O_t are zero, and allowing for a slightly different debt repayment schedule when computing A_t, the implicit interest cash-flow at the debt rate). As such, all the previous comments and criticisms of VANCIL apply equally to the BHW method. Generally, commentators in the literature do not credit BHW with having made any material contribution towards the unravelling of the leasing decision.

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1. As will be noted later, some writers object to the residual value of the asset being discounted at the cost of capital, prefering instead to use a rate appropriate to the "riskyness" of the cash-flow : "One primary element of risk introduced into the lease-vs-borrow decision comes from the salvage value and this risk should not be ignored. " ROENFELD AND OSTERYOUNG [117,p76].

2. For example : JOHNSON & LEWELLEN [79,p818] : SCHALL [120,p1211] ; and WESTON & BRIGHAM [144,p580] . For an illustration of their identity see the SCHALL reference.

A most significant paper by JOHNSON & LEWELLEN [79], (hereafter J & L), presented the argument that the correct comparison should be the lease-or-buy decision. This was quite contrary to extant models where a debt financing alternative to leasing was usually proposed. J & L's theoretical defence of this proposition was based upon (what has been termed in this Thesis) the philosophy of discriminatory financing. Thus :

> "The literature has established the principle that the attractiveness of a capital investment opportunity should be appraised without reference to the specific form of financing employed in its execution, and without including explicit finance charges such as dividend and interest payments as part of the cash-flows whose present value influence project worth. Rather, all such charges - and additional implicit ones associated with the risks borne by the enterprise which constitutes the discount rate that is used to compute an investment's present value. Inclusion of the financing charges again in the evaluation of the expenditure opportunity itself would clearly involve double counting. "
>
> JOHNSON & LEWELLEN [79, p815].

The various arguments presented throughout this Thesis clearly countenance J & L's statement, however, a disagreement will be observed in the application of this school of thought when the researcher's model is presented in Chapter 9. J & L expand their argument to state that the much favoured borrow alternative is conceptually invalid because it is incorrect :

" ... to associate a specific financing arrangement - e.g. a loan - with a specific undertaking even though the two happen, in the course of corporate affairs, to occur simultaneously ..... It is inappropriate, therefore to mix the financing and investment segments of a decision in a cash-flow analysis, as it is inappropriate even to attempt to attach one to the other. "

JOHNSON & LEWELLEN [79,p815/6].

This analysis supports the doctrine that finance is "non asset-specific" : that is, within the context of the total investment and financing decisions of the company it is erroneous to equate a particular tranche of capital with a particular investment. It would follow, therefore, that the 'borrow' alternative to leasing is discriminatory![1] The leasing option, however, cannot be anything other than asset-specific. In defence of their attitude towards the lease- or-buy decision J & L ask :

".... whether it would be possible for a firm to obtain a sum of money, equal to the stated lump-sum purchase price of an asset, by entering into an agreement called a "lease" with the asset's vendor - and then use the money for some other corporate purpose, foregoing the acquisition of the asset itself. Quite obviously, this would not be the case. One cannot obtain funds with lease arrangements, as one can

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1. " ... an exercise in self deception." J & L [80,p1024].

only obtain particular physical assets. Accordingly, the appropriate capital budgeting parallel is lease-vs-buy. "

JOHNSON & LEWELLEN [79,p816,fn.3].

J & L next consider the issue of appropriate discount rates to be applied in their lease evaluation model and reject the view that a single cost of capital should be used for all the cash-flows because there is a distinct difference in the market uncertainty and predictability of the outright purchase acquisition of an asset vis-a-vis a lease contract and its attendent obligations.

"The investment community's attitude towards the former is captured in the firm's cost of capital, but the latter are noticeably less contingent. Specifically, they involve commitments by the enterprise which, in terms of the securities market's view of their reliability, necessarily fall into the same risk category as do the firm's borrowing arrangements. Because they have that similarity, they should logically be accorded a capitalisation rate which matches the one investors can be observed to demand from such arrangements : the effective interest rate on the firm's outstanding debt. "

JOHNSON & LEWELLEN [79, p818].

The JOHNSON & LEWELLEN model for lease evaluation may now be stated, the incremental net present value resulting from purchasing the asset is as follows:

$$\Delta \text{NPV} = \text{NPV(P)} - \text{NPV(L)}$$

$$= \sum_{t=1}^{N} \frac{TD_t - O_t(1-T)}{(1+K)^t} + \frac{R_N}{(1+K)^N} - P + \sum_{t=1}^{N} \frac{L_t(1-T)}{(1+d)^t}$$

letting O_t and R_N equal zero; then :

$$\Delta \text{NPV} = -P + \sum_{t=1}^{N} \frac{L_t(1-T)}{(1+d)^t} + \sum_{t=1}^{N} \frac{TD_t}{(1+K)^t}$$

It will be noticed immediately that L_t has <u>not</u> been stripped of its implicit interest component as the argument presented by J & L would have suggested. They defend this action as follows:

> "We are uninterested in whatever division of this lease payment into alleged "interest" and "principal" components the Lessor may arbitrarily decide to specify. The entire payment is a cash outflow for the Lessee and is tax deductible by him. For that reason, only the total size of the payment is of concern for decision purposes. "
>
> JOHNSON & LEWELLEN [79, p820,fn.10] .

This argument infers that a borrower can never ascertain the correct division of the repayment between interest and principal and in consequence can not establish the cost of the loan to the company. This does not seem to be a very tenable argument because the interest component of a loan will automatically and inexorably incorporate the lender's various expenses, overheads, profit and money costs : for that is the interest price to be paid; there is nothing "artificial" about its composition.

Thus, while agreeing with J & L that it is improper to include the financing charges in the lease-or-buy decision cash-flows, it is concluded that they fail to implement their own proposal rigidly..

Finally, J & L reject the frequently advocated sequential decision procedure -- investment appraisal followed by an analysis of the financing alternatives for accepted projects -- noting that it can produce incorrect results :

> "Sufficiently attractive lease terms can in fact reverse the investment decision ..... Clearly, there will be some sufficiently low lease cost at which virtually any asset will be desirable. A definitive conclusion to forego an investment, therefore, cannot logically be made when leasing is a possibility until the second step of calculating what we have referred to above as ΔNPV is executed, and the result compared with the original net present value of purchase. "
>
> JOHNSON & LEWELLEN [79, p822].

The J & L article provoked extensive comment in the financial literature which, with the exception of GORDON [61] [1], was highly critical of the proposed model and its theoretical underpinning.

There is a considerable schism amongst academics on the issue of the appropriate discount rate(s) to apply to the various

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1. "Their review of the literature and formulation of the problem was undoubtedly facilitated by thinking on the subject because it has resulted in a model that I believe is both completely general and accurate. " GORDON [61,p245].

cash-flows : the discord is particularly loud over the consequences of discounting the depreciation tax shelter (which is effectively lost because the company has leased rather than purchased outright) at the company's cost of capital, instead of the after-tax interest rate on debt.[1] J & L argue that K is the appropriate rate because it accords with conventional capital budgeting practice; however, this is refuted by a number of writers.[2]

> "Because of its predictability, the tax shield from depreciation should be discounted at the same rate as the after-tax lease payments, namely at d rather than K."[3]
>
> LUSZTIG [91,p1017]

By contrast other writers[4] insist that leasing should not be considered as a special case but should be treated uniformly using the cost of capital as a discount rate for all cash-flows :

> "If, as J & L argue, the lease project is like any other capital project, then it ought to be analysed on a consistent basis. Specifically, the cash-flows of the

---

1. Commentators note that the results of the numerical illustration provided by J & L changes from a net advantage to leasing of 1043 to a much reduced net advantage of 5 if the interest rate on debt is used when discounting the depreciation tax shelter.
2. BIERMAN [18,p1021]; GORDON [61,p248]; ROENFELDT & OSTERYOUNG [117,p79]; SCHALL [120,p1211]; and MOYER [103,p40].
3. But see note on page 328 ; for circumstances when the contractual certainty is by no means assured.
4. LEV & ORGLER [88,p1022]; SARTORIS & PAUL [118,p48]; and BOWER [152,p31].

lease project should be discounted at one rate and that rate should be the firm's overall cost of capital encompassing the costs of all forms of capital. It would seem to us that any treatment other than this would be inconsistent with other capital projects and would tend to treat leasing as a special case of the capital project analysis. "

CLARK, JANTORNI & GANN [35,p1015/16].

BOWER [151,p29] asserts that it is inequitable to discount the tax relief foregone when leasing at the higher rate K, while simultaneously discounting the tax relief on lease repayments at the lower rate of d. Such a procedure can only result in a biased analysis which favours leasing. BOWER recommends the use of K when discounting tax relief [151,p31], arguing that taxation rates and the amount and timing of taxation payments are uncertain and risky, indeed they "may be systematic", as such the after-tax interest rate is "too low a rate to apply to tax shelter terms. "

Another criticism levelled at the J & L model is widely reported throughout the literature:[1]

"Despite their concern about excluding "explicit finance charges such as dividend and interest payments as part of the cash-flows," L_t is left to include just such financing costs. When such payments are discounted at d, J & L retain some measure of the double counting which they purport to avoid. "

LUSZTIG [91,p1017]

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1. SARTORIS & PAUL [118,p48]; LUSZTIG [91,p1017]; and LEV & ORGLER [88,p1022/3].

LUSZTIG then argues that if J & L are successfully to exclude the financing cash-flows from the lease repayment, the lease alternative would always be chosen. This arises as follows : if the salvage value and pre-tax cash operating costs are disregarded and taxation is 50% then :

$$\Delta \text{ NPV} = \sum_{t=1}^{N} \frac{T(D_t + L^*_t)}{(1+d)^t} - P$$

where L^*_t is the lease repayment net of the imputed interest charges, and Δ NPV is as specified by J & L.

As $\sum_{t=1}^{N} T(D_t + L^*_t)$ will equal P when T is 50% -- by definition -- it follows automatically that Δ NPV will always be negative and the lease always chosen, [91,p1018].

> "Intuitively, if we assume 100% debt financing as an alternative to leasing and hold interest charges to be equal under these approaches, it becomes apparent that the present value of tax shields occasioned by D_t will, in fact, be significantly greater than those arising from L^*_t (given that earlier lease payments are largely comprised of financing costs) .... Repayments on the debt financing, thus become the critical decision variable and we are very quickly returned to approaches suggested in existing literature which do in fact separate the decision to "acquire" from the decision about how the "acquisition" is to be financed. "
>
> LUSZTIG [91,p1018].

Another rejection of the lease-or-buy alternative suggested by J & L comes from LEV & ORGLER :

"The lease-or-borrow approach seems, however, to make a lot of sense since the two alternatives - leasing and borrowing - are equivalent from the point of view of financial risk. "

LEV & ORGLER [88,p1023].

The need to "neutralise" financial risk in the decision model, according to LEV & ORGLER, necessitates a lease-or-borrow approach because a lease-or-buy analysis cannot take account of the risk differences resulting from capital structure changes.

The wealth of comment initiated by the JOHNSON & LEWELLEN proposal is indicative of the worldwide growth of leasing and the corresponding need to improve old techniques and provide new ones. However, the issues posed at the beginning of this Chapter still remain largely unresolved; indeed, academic thinking on the leasing decision has, if anything, proliferated and diversified since the J & L debate.

The next paper to be considered is by GORDON who differs from the arguments of J & L in four specific areas :

"1. the correct discount rate for risk free cash-flows;
2. a difference in term between the lease payments and the life of the capital asset;
3. differences in risk among the components of the buy and lease cash-flows; and,
4. neutralizing the implicit debt financing tied into the lease alternative. "

GORDON [61,p245].

GORDON differs from previous writers in actually arguing the MM [101] capital budgeting model, using the tax shield approach, which recognises the risk between operating cash-flows and depreciation tax shields. Thus, the NPV of the buy option is :

$$NPVP = -P + \sum_{t=1}^{N} \frac{(1-T)F_t}{(1+K)^t} + \sum_{t=1}^{N} \frac{TD_t}{(1+j)^t}$$

where 'j' is the interest rate on risk free cash-flows. Although GORDON wishes to compare leasing with buying there would appear to be a semantic volte-face implicit in his model because the buy option is really borrow-and-buy. GORDON notes :

> "To neutralise the tax advantage in the lease option due to the implicit debt financing we reduce P to $(1 - T)L_0$ and replace the balance of P with a loan. The amount of the loan is $P-(1-T)L_0$, and it will be paid in N periods by means of equal annual payments that cover interest and principal at the interest rate at which the corporation borrows. "
>
> GORDON [61,p248]

NPVP then becomes[1] : [61,p248]

$$NPVP = -(1+T)L_0 - \sum_{t=1}^{N} \frac{(1-T)(S_t-N_t)+N_t}{(1+j)^t} + \sum_{t=1}^{N} \frac{(1+T)F_t}{(1+K)^t} + \sum_{t=1}^{N} \frac{TD_t}{(1+j)^t}$$

The lease alternative also incorporates the risk-free rate for the lease repayments and the operating costs assumed by the Lessor but

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1. Note : S_t = equivalent loan payment and N_t = implicit principal in that payment. Expanding the second term gives: $-S_t+T(S_t-N_t)$ which is the loan payment less the tax deductability of the implicit interest.

payable if the asset is owned (O_t) [1] Thus, the NPV of the lease is :[2] GORDON [61,p247].

$$NPVL = -(1-T)L_o - \sum_{t=1}^{N} \frac{(1-T)L_t}{(1+j)^t} + \sum_{t=1}^{N} \frac{(1-T)F_t}{(1+K)^t} + \sum_{t=1}^{N} \frac{(1-T)O_t}{(1+j)^t} - \frac{R_N}{(1+K)^N}$$

Accordingly, the advantage of buying over leasing is expressed in the following equation : GORDON [61,p248].

$$NPVP-NPVL = \sum_{t=1}^{N} \frac{(1-T)(L_t-S_t)-TN_t-(1-T)O_t}{(1+j)^t} + \frac{TD_t}{(1+j)^t} + \frac{R_N}{(1+K)^N}$$

In a subsequent 'comment' HENDERSON suggest that GORDON has made a mistake when "neutralising" the implicit debt financing alternative. It is argued that the GORDON model implicitly assumes that greater leverage is available with debt financing than with the lease option. Accordingly, this introduces a bias towards buying. The issue hinges on the size of the first debt repayment :

> ".... at any positive tax rate (T) the first payment GORDON proposes under the buy option will be less than the first lease payment, i.e. $L_o > L_o(1-T)$ for any $T>0$. Necessarily the amount of remaining debt will be greater under the buy option. This approach is at considerable variance with earlier attempts

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1. "O_t is discounted at the risk free rate on the assumption, frequently correct, that the cash outlays assumed by the Lessor are fixed charges subject to little or no uncertainty " [61,p247], the lease repayments are discounted at the risk free rate because they "are legal obligations of the firm" [61,p247]

2. The salvage value is somewhat more complicated than that indicated here, GORDON allows for the possible purchase of the asset at period N. As this is not permitted under U.K. revenue law it has been omitted in this presentation.

to analyse the problem where the avowed purpose was to make the degree of leverage equivalent between the two alternatives. "

HENDERSON [73,p149]

HENDERSON recommends that the technique indicated by GORDON could be improved if the debt alternative was made more comparable with the lease when computing the initial and subsequent payments. The proposed alteration to the model would retain the same form of cash-flow for the buy option (excluding the loan) and amend the lease specification so as to define :

"..... the cost of the asset as the cash price, plus the present value of any increase in payments due to the use of a lease rather than a comparably structured loan, but reduced by the present value of any added tax shields available because of the lease. "

HENDERSON [73,p148]

Thus, the 'corrected' lease cash-flow profile should be as follows; with the net advantage shown below :

$$NPVL = -P - \sum_{t=o}^{N} \frac{(L_t - S_t)}{(1+j)^t} + \sum_{t=o}^{N} \frac{T[L_t - (S_t - N_t)]}{(1+j)^t} + \sum_{t=1}^{N} \frac{(1-T)F_t}{(1+K)^t} + \sum_{t=1}^{N} \frac{(1-T)O_t}{(1+j)^t} + \frac{R_N}{(1+K)^N}$$

$$NPVP - NPVL = \sum_{t=o}^{N} \frac{(1-T)(L_t - S_t) - TN_t}{(1+j)^t} - \sum_{t=1}^{N} \frac{(1-T)O_t}{(1+j)^t} + \sum_{t=1}^{N} \frac{TD_t}{(1+j)^t} + - \frac{R_N}{(1+K)^N}$$

"The immediate (t=o) advantage <u>should</u> accrue to leasing because none of a loan down payment is tax deductible as is all of a lease payment. That is, with equivalent borrowing (equal

first payments) Lo=So and So=No. So for t=o,

$(1-T)(L_t-S_t)-TN_t \ / \ (1+j)^t = -TN_t$, and $N_t=L_o$; therefore the first term would equal -TLo. Simply put, the immediate advantage to leasing is the tax shield provided by the first payment. Gordon's formulation overlooks this. "

HENDERSON [73,p149]

Another variant on the theme of correct debt comparators is offered by BLOOMFIELD & MA [19], who suggest that the technique proposed by BHW gives an "incorrect and misleading evaluation" which produces a "sub optimal purchase plan."[1] To achieve an exact congruity of financing options they argue that the alternative debt plan should impose "identical contractual obligations" with the lease schedule.

"In order to put the borrow and purchase plan on an equivalent basis the loan repayments must equal the lease payments in period t=1, 2...N. With this uniformity of payment streams the two options are on a strictly comparable basis - each option utilises the same portion of the firm's borrowing capacity and restores it at the same rate during the period from t=1 to t=N. "

BLOOMFIELD & MA [19,p298]

Thus, the company should borrow an amount Mo at period t=o and incur a series of obligations $S_1, S_2 \ldots S_N$ which are of the same size and pattern as the lease schedule $L_1, L_2 \ldots L_N$.

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1. It will be recalled that BHW [20] constructed a financing option which incorporated a loan limited to the amount of the purchase price with repayment proportional to the lease payments.

"With the firm paying interest at rate 'd' on its borrowings, the amount Mo which the firm can borrow and repay with $S_t=L_t$ for t=1 ... N is given by :

$$Mo = \sum_{t=1}^{N} \frac{L_t}{(1+d)^t}$$

BLOOMFIELD & MA [19,p298]

One of the requirements of the BLOOMFIELD & MA model is that the company maintain a "target average debt-equity ratio" [1] The problem presented by this assumption is that for debt instruments to "utilise the same portion of the firm's borrowing capacity and restore it at the same rate" necessitates repayment schedules which have the same profile, interest rate, and time period. Otherwise the capital recovery and/or capital outstanding in the debt and lease contracts will vary and, ipso facto, the borrowing capacity absorbed and restored will differ. No amount of artificial manipulation can ever hope to bring into correspondence two fundamentally different repayment schedules. This is the case with BLOOMFIELD & MA's solution : the CAPITAL RECOVERY TABLE for each of the alternatives is still dissimilar even after the debt comparator has been amended.

Novel to their approach, however, is the use of an equity discount rate for all the cash-flows in the analysis :

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1. However, minor variations in the ratio over time resulting from the irregular nature of financing issues does not affect the cost of equity. [19,p297]. This removes a most critical interdependency,

"The justification of this approach lies in the stated objectives of the firm - the maximisation of the value of the outstanding shares. If firms are to make decisions which are consistent with this objective then the discount rate employed in the comparison of financing alternatives must be the same rate which the market uses in valuing the expected returns to shareholders. "

BLOOMFIELD & MA [19,p299]

To sustain this objective BLOOMFIELD & MA must make a further complementary assumption that the company believes that the addition of fixed charges under a lease would be viewed by the market in the same light as equivalent fixed charges arising from new borrowings, and that acceptance of the lease or a borrowing alternative would not affect the firm's equity capitalisation rate.[1] Given these assumptions (and an investment project associated with the lease that is acceptable when evaluated at the weighted average cost of capital [19,p297]) the lease option and purchase plan equations may be stated :

BLOOMFIELD & MA [19,p298/9]

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1. GRINYER notes [64,p232], "their assumption that the equity cost is insensitive to changes in gearing would be questioned by many informed readers." A leasing paper by KELLER & PETERSEN [81] reviewed shortly, considers this problem in their evaluation proposal.

Lease cash-flows :

$$\sum_{t=1}^{n} F_t - L_o(1-T) - \sum_{t=1}^{N} L_t + \sum_{t=1}^{N} TL_t + \sum_{t=1}^{n} [O_t(1-T) - TD_t]$$

Purchase-Borrow plan :

$$\sum_{t=1}^{n} F_t + M_o - P - \sum_{t=1}^{N} S_t + \sum_{t=1}^{N} T.A_t$$

as F_t is common, and $L_t = S_t$ for t=1 to N, the NPV formulations are :

$$NPVL = -L_o(1-T) + \sum_{t=1}^{N} \frac{TL_t}{(1+k_e)^t} + \sum_{t=1}^{n} \frac{O_t(1-T) - TD_t}{(1+k_e)^t}$$

$$NPVP^1 = M_o - P + \sum_{t=1}^{N} \frac{T.A_t}{(1+k_e)}$$

One extraordinary feature of this model is the possible range of values that the equivalent loan can take, each of which has a different effect upon the evaluation and the initial capital

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1. This equation is to include "the expected proceeds from asset disposal" if relevant.

requirement.[1] BLOOMFIELD & MA note that one of the following relationships must hold for M_o :

1. $M_o < P - L_o$ 2. $M_o = P - L_o$

3. $P - L_o < M_o < P$ 4. $M_o \geqslant P$

Assuming that the borrow option is selected, then implicit in these relationships is the requirement for a supplementary injection of capital in addition to the amount raised by the equivalent loan. Expressed simply, if state 1. occurs then the company requires a further capital input of $> L_o$; if 2. occurs $= L_o$; if 3. occurs $< L_o$ but greater than zero. BLOOMFIELD & MA explain each of the above alternatives as follows; [19,p299][2]

— "If 1 holds the firm would require additional funds on hand in period t=o under the loan alternative than under the lease option." Thus, the amount raised from the loan plus the cash

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1. It is interesting to note that SCHALL [120] suggests a somewhat similar approach, in that, in his example he uses an asset costing £1500 and makes the comparison between a lease contract for that amount and a purchase alternative of £1200 debt and £300 equity. There is no explanation in the text to justify this division other than a footnote: "Lease and debt-financing of an asset are similar in that both involve a fixed obligation of the firm. However, lease payments are necessarily tax deductible whereas there may be a limit on the proportion of firm earnings that is permitted tax deductibility; also, bond indentures and other loan agreements generally involve more restrictive covenants than do lease agreements, e.g. dividends, working capital requirements, additional leverage by the firm, etc. These differences imply ... that the most desirable alternative to lease financing may not be 100% debt financing. Whether lease and debt obligations are regarded as equivalent, upon leasing an asset the firm may reduce its other debt to some degree to maintain a desired degree of firm leverage." SCHALL [120,p1207,fn10]

2. It is worthy of note that this is the first published attempt to model the surely unavoidable three way relationship of leasing, own funds and borrowing. As such it is a welcome development from the excessive pre-occupation with the pair-only comparison of lease-vs-borrow or lease-vs-buy. BLOOMFIELD & MA however do not signally develop this inherent richness in their model.

available from L_o is less than the cost of the asset and so further internal funds are needed to initiate the borrow and buy plan.

— "If 2 applies then funds requirements in period t=o are the same under both options." This is self explanatory in that the loan plus L_o equals the cost of the asset.

— "If 3 holds then the firm raises a loan greater than is necessary to cover the asset purchase price, given that the funds required for L_o are available." In this case the loan raised is larger than required, $M_o+L_o > P$, and the "surplus" capital is invested (internally or externally) at the weighted average cost of capital. The excess capital will be the portion of L_o not required to commence the borrow and buy option.

— "If 4 holds the firm would have surplus funds equal to or greater than L_o in the initial period." In other words, the pre-assigned L_o will not be required for the borrow option but will be invested along with the surplus loan at the cost of capital.

The BLOOMFIELD & MA approach is criticised by GRINYER for the unnecessary use of an equity discount rate and the incorrect composition of the lump-sum borrowing alternative. GRINYER suggests that the true comparison should be between the outright purchase price of the asset and the tax-adjusted equivalent loan.

"(Bloomfield & Ma) emphasised the contractual payment aspect, and ignored the taxation generated associated cash-flows, in setting up an equivalent stream of cash to be discounted to year zero in finding the amount borrowed (M_o). Their approach seems, at least to the author, to be in error because the

comparison should correctly be made between alternative sets of cash flow implicit in the financing alternatives, and such cash-flows are likely to include taxation elements in addition to purely contractual ones. "

GRINYER [64,p232]

Thus the notional amount which should be raised under the borrowing option is equivalent to the after-tax cash-flows associated with the lease, and is given by G_o: [64,p233]

$$G_o = \sum_{t=o}^{N} \frac{(L_t - O_t)(1-T)+TD_t}{(1+i)^t}$$

If P_o, the cost of the asset, is greater than or equal to the value of G_o then the lease should be chosen. GRINYER shows that this conclusion can be achieved using the BLOOMFIELD & MA model on the assumption that the equivalent loan (M_o*) equals G_o from t=1-N.

"In the above analysis leasing is viewed as an alternative to debt which would otherwise have been issued in achieving the target ratio. The crutial assumption is that leasing is viewed by the market as an alternative to debt with equivalence being established on the basis of the after-tax cash-flows arising under each alternative, which assumption may be the most realistic at present. If this assumption is accepted there remains no differential cash-flows between the lease and debt alternatives considered, so that the equity holders' rate has no part to play in the evaluation of financing by borrowing or leasing. "

GRINYER [64,p234]

GRINYER is concerned, however, that the borrow or lease alternatives may imply different degrees of variability when viewed by the market[1] :

> "with the result that the cost of equity capital changes to reflect the fact (which would indicate an unrecognised imputed cost of the leasing flows)."
>
> GRINYER [64,p233]

Those companies which believe the market will consider the leasing option to be more risky (say), should apply an adjustment to the value of G_o based upon "the change in the market value of total equity in the firm as a result of the changed risk associated with lease rather than debt financing" [64,p233,fn3]. The correction to G_o requires that the analyst establishes the expected equity discount rate under each new financing alternative and then discount the total dividend flow to the shareholders under each assumption, the difference is then added to G_o[2]. However :

> "It seems likely that management will consider that it is not possible to make the required estimates with sufficient accuracy to justify the exercise, for even if the necessary adjustment could be estimated with adequate accuracy it might be immaterial in amount."
>
> GRINYER [64,p233]

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1. But will "the market" know of leasing finance? U.K. published accounts are not especially forthcoming on this matter. However, ED18 may alter this.

2. See GRINYER [64,p233,fn3]

BLOOMFIELD & MA also expressed concern about the effects of the two financing options on the equity rate :

> "It is possible, however, that shareholders do not regard lease payment obligations as equivalent to debt repayment obligations of equal size and timing. The equity capitalisation rate if the lease option was adopted then may differ significantly from the rate resulting from the alternative financing plan. Such a possibility changes the whole complexion of the lease evaluation problem and no solution is offered for this special case. "
>
> BLOOMFIELD & MA [19,p301/2]

The formulation of the leasing problem prescribed by KELLER & PETERSEN [8]]specifically takes into consideration the anticipated influence of the incremental leasing decision upon the weighted average cost of capital and the expected return demanded by existing equity holders. Central to their analysis is the assumption that companies undertake financing decisions with the specific intention of maintaining a target debt-equity ratio which will minimise the firm's cost of capital.[1] If the optimal financial structure is currently attained then the decision to lease or buy "may cause different incremental effects on the firm's financial structure depending upon the market's perception of the nature of the leasing transaction " [81,p408] In their opinion this influence has not been adequately considered or correctly quantified in the

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1. KELLER & PETERSEN assume the traditionally-held view of a 'U' shaped cost of capital curve, see [81,p406]

extant literature.[1]

"Under the buy option the financial manager can be thought to be expanding the size of the firm through simultaneous increases in debt and equity in order to maintain the optimal debt-equity mix. When the asset is acquired by entering into a lease agreement which the market perceives as a financing arrangement, the effect is to drive the firm away from its optimal debt-equity relationship and to <u>derive a higher cost of capital</u>."[2]

KELLER & PETERSEN [81,p408], emphasis supplied.

KELLER & PETERSEN argue that because the lease option is financed totally by debt -- and therefore the optimal debt-equity relationship is disturbed - then the lease cash-flows should be discounted at the higher ("pro forma") cost of capital pertaining after the decision : K*. By contrast the purchase option should be discounted at the "after-tax target cost of capital for the firm." [81,p409] Two new parameters are also introduced into the model, although they are as enigmatic and difficult to quantify as the data requirements for the technique previously suggested by GRINYER [64]

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1. This problem <u>was</u> raised by BHW much earlier in the literature : "If leasing changes (corporate) risk, or if reporting differences or other factors cause the market to act as if leasing changes this risk, then lease and loan alternatives can be evaluated using different (discount) rates." BHW [20,p260]
2. As noted previously in section 4.6 and discussed later in section 9.6, it is not automatically to be supposed that a higher cost of capital will result from the use of leasing, it is possible that the change will be insignificant or the cost of capital may even reduce.

"ΔR_e = Change in return required by existing residual equity to maintain market value of residual equity.

ΔR_{dt} = After-tax change in return required to maintain the market value of existing debt-equity." [81,p409]

These terms reflect the anticipated change in the risk-return profile of the company following the acceptance of leasing; however, no guidance is given by the authors as to how these figures are established. The complete model may be stated thus:

KELLER & PETERSEN [81,p410 & 412]

$$NPV(P) = \sum_{t=1}^{N} \frac{F_t(1-T)}{(1+K)^t} + \sum_{t=1}^{N} \frac{TD_t}{(1+K)^t} + \frac{R_N}{(1+K)^N} - P$$

$$NPV(L) = \sum_{t=1}^{N} \frac{F_t(1-T)}{(1+K^*)^t} + \sum_{t=1}^{N} \frac{L_t(1-T)}{(1+K^*)^t} + \sum_{t=1}^{N} \frac{\Delta R_{dt} + \Delta R_e}{(1+K^*)^t}$$

It will be perceived that the NPV(L) calculation attempts to double count the marginal influences caused by the introduction of leasing, by including an explicit term relating to the capital structure and equity holders ($\Delta R_{dt} + \Delta R_e$) <u>in addition to</u> a modified cost of capital discount rate. It would appear to the writer that one or other of the terms is permissible, but not both. Altogether, this contribution appears to take the discussion of lease analysis very little further in any really useful way.

SCHALL [120] disagrees with the use of a cost of capital discount rate in the leasing decision and suggests the approach offered by the Value Additivity Principle.

"The usual situation justifying the use of the firm's cost of capital (all assets with identical return distributions and like methods of financing) involves estimating that rate at which investors discount firm total returns in determining firm value. With assets of differing risk and with more than one financing option (e.g. lease or buy), the firm must estimate K by observing market rates or comparable streams; use of a firm's average is no longer valid."

SCHALL [120,p1208]

As was previously discussed in Chapter 5, the VAP uses the discount rate which market investors would apply to individual streams of cash-flow. Taken to its logical extreme this implies an individually determined discount rate for each component of the composite lease-or-purchase decision cash-flows; and "such rates are likely to vary from project to project" [120,p1208]. The "expected return discounting model" can be expressed as follows, by estimating the increase in shareholders wealth $\delta(SW)$ as a result of each decision. SCHALL [120,p1207 & 1210].

$$SW(P) = \sum_{t=1}^{N} \frac{(F_t - O_t)(1-T) + TD_t}{(1+k_g)^t} + \frac{R_N}{(1+k_g)^N} + \sum_{t=1}^{N} \frac{A_t \cdot T}{(1+k_A)^t} - P$$

$$SW(L) = \sum_{t=1}^{N} \frac{(1-T)F_t}{(1+k_p)^t} - \sum_{t=1}^{N} \frac{(1-T)L_t}{(1+k_L)^t}$$

Where K_g, K_A, K_F & K_L are the discount rates appropriate to each cash-flow stream. SCHALL suggests that in estimating K_L, for example, "the firm might observe the valuation of lessee firms with similar

assets as those being evaluated. ... If L is a relatively low risk stream, k_L may approximate the borrowing rate k_A." [120,p1209]
Whether the first half of this quote is a realistic suggestion is a matter of opinion, but it must surely be an exceedingly optimistic one in view of the current restricted disclosure of leasing information in company accounts.

This approach to the analysis of a lease has many critics, of whom the researcher is one, because it exemplifies the concept of "discriminatory financing" discussed earlier in Chapter 4 of the Thesis.[1] To reiterate the position taken here :

> "The firm's periodic net cash-flow is composed of a very large number of positive and negative flows, <u>each</u> associated with a different degree of uncertainty or predictability. It is clearly inappropriate to single out one flow .... for special treatment. Either a <u>complete</u> breakdown of the net cash-flow is performed (AN INSURMOUNTABLE TASK INDEED), or a unique discount rate applied to the <u>net</u> cash-flow stream, as is conventional in the capital budgeting literature. "
>
> - LEV & ORGLER [88,p1022]; emphasis (capitals) supplied.

SCHALL also acknowledges that :

> "The above (technique) is not meant to gainsay the practical difficulties in ascertaining the K terms .... For the practitioner ... the analysis here is meant to suggest that some attempt be made

---

1. Notable writers who argue this position are VAN HORNE [138,pp105-110] and WESTON & BRIGHAM [144,pp348-352]; within the leasing literature LEV & ORGLER [88,p1022] and SARTORIS & PAUL [118,p48]are representative of opinion. See also FAWTHROP & TERRY [49,p88].

to adjust for individual asset risk even though a precise determination is impossible. "

SCHALL [120,p1209]

At issue is the problem of practical implementation : the first sentence of this quotation might reasonably be described as a masterpiece of understatement. Undeniably, the technique proposed by SCHALL is intricate and exceedingly difficult to execute. Theoretical rigour is not to be abandoned, but the criteria of feasibility of analysis and measurability of variables cannot be altogether disregarded in the search for an economically efficient decision algorithm. Leasing is not merely a pleasant academic debate.

III A REVIEW OF THE LEASING LITERATURE : IRR MODELS

A significant section of the leasing literature addresses itself exclusively to the problem of establishing the implicit interest rate, or internal rate of return, of a lease agreement. As far as can be ascertained most of the models which have been generated emanate from writers in the USA, which naturally results in the adoption of tax and depreciation policies which do not reflect current U.K. practice. As these have a significant bearing on the outcome of the decision, a special discussion of implicit interest rates within the U.K. context will be undertaken in Chapter 8. Meanwhile, the extant literature on IRR models will be considered. DOENGES vindicates the search for a correct assessment of a lease contract's IRR as follows :

"It may often be desirable to have a rate of return figure for a leasing alternative as a means of measuring the cost

of leasing as a financing source of funds. Such a figure can be useful when compared with interest rates of borrowing alternatives, or used as a means of comparison of two or more leasing plans. In addition a leasing "rate of return" figure must be used when a lease is included in calculating a firm's weighted average cost of capital "

DOENGES [38,p32]

Perhaps the first major IRR lease model[1] was developed by BRIGHAM but within the context of an effort to establish the rate of return on a lease contract to a Lessor. Solving for 'r', the implicit after-tax interest rate, the model equates the present value of the lease payments after tax relief with the cost of the asset less the tax shield foregone by depreciation, and incorporating, if appropriate, the salvage value of the equipment at the termination of the lease. Thus,

BRIGHAM [21,p72/3]

$$0 = -P + \sum_{t=1}^{N} \frac{L_t}{(1+r)^t} - \sum_{t=1}^{N} \frac{(L_t - D_t)T}{(1+r)^t} + \frac{R_N}{(1+r)^t}$$

This model was to re-emerge in the literature, with the signs reversed so that it could be applied to the Lessee, see DOENGES [38,p35], but largely it has been ignored or not quoted.

As FINDLAY [55,p232] observed : "the first pure lease model appears to have been presented as a solution to an example without text

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1. If we disregard the "Profitability Index" method by McEACHRON [92,p218] which was more akin to an NPV model although some subsequent writers suggest it was an IRR model.

comment in QUIRIN." The formula, shown below, excluded the effect of residual values (assuming it to be zero) and somewhat strangely but in common with BRIGHAM assumes all cash-flows commence at period 1.

QUIRIN [113,p119]

$$0 = P - \sum_{t=1}^{N} \frac{L_t}{(1+r)^t} + \sum_{t=1}^{N} \frac{(L_t - D_t)T}{(1+r)^t}$$

Arguably, the critical debate in the IRR lease literature was initiated by BEECHY. Believing, as he did, that the investment and financing decisions should be conducted seperately, BEECHY argued that the use of a cost of capital appraisal rate in the leasing algorithms of VANCIL, BHW and FERRARA was in error. As the cost of a financing source was an integral part of the weighted average cost of capital it followed that "it was improper to turn around and use the cost of capital to evaluate the cost of debt" [14,p376]. To BEECHY the cost of capital should be the result of the financing decision and not the cause[1]. His misgivings with NPV models were :

> "Firstly, it is difficult to justify conceptually the division of the cash-flow effects of a lease. Secondly, the results of the analyses, being expressed as present values, are not interpretted in the same manner as loans (i.e. effective interest rates). And thirdly, the results are dependent upon the cost of capital or cut-off rate used in discounting the tax effects."
>
> BEECHY [14,p377]

---

1. See also VAN HORNE [138,p576] who concurs with this argument.

To counter these weaknesses the "effective interest method" was devised on the conviction that "decision makers are accustomed to working with effective interest rates as indicators of the cost of debt" [14,p375]. The validity of this observation is borne out in the empirical work supporting this Thesis.[1] The implicit interest rate model computed by BEECHY incorporates repayments on an "equivalent loan" which mirrors the same pattern as the lease instalments. This technique, corresponding to that suggested by BHW [20], provides a figure for the difference in tax deductions under a lease compared with an equivalent debt source at an assumed standard debt cost, see BEECHY [14,p377/8]. The before-tax implicit interest rate model could then be enumerated as follows :

BEECHY [14,p378].

$$O = P - \sum_{t=o}^{N} \frac{L_t}{(1+i)^t} + \sum_{t=o}^{N} \frac{(L_t - D_t - A_t)T}{(1+i)^t}$$

MITCHELL [99] disputed BEECHY'S method of analysis noting that it failed to consider the tax deductability of interest. In order to establish a correct after-tax implicit interest rate the following amendment was proposed :

MITCHELL [99,p310/11]

$$O = P - \sum_{t=o}^{N} \frac{L_t}{(1+r)^t} + \sum_{t=o}^{N} \frac{(L_t - D_t)T}{(1+r)^t}$$

---

1. See Chapters 7 and 8 below.

BEECHY concedes that there is an implicit error in his methodology and an adjustment is needed to his original equation to bring it into correspondence with MITCHELL :

> "In (my original method) the loan interest is permitted to offset the implicit interest in the lease, so that the tax adjustment actually applies only to the difference between the depreciation under borrowing and the "implicit depreciation" in the lease. Therefore the gross amount of the interest is allowed to flow through to the final cash-flow, yielding a before-tax interest calculation. Unfortunately, it works exactly right only when the lease payments are identical to the equivalent loan repayments (i.e. $L_t = S_t$). Otherwise, the premium of interest charged by the Lessor is affected by taxes in the calculation and the resulting rate is a hybrid : partially before-tax and partially after-tax. The correct statement of the original equation should be :

$$0 = P - \sum_{t=o}^{N} \frac{L_t}{(1+i)^t} + \sum_{t=o}^{N} \frac{(S_t - D_t - A_t)T}{(1+i)^t}$$

This will permit the full amount of the lease payments to be discounted, since the sum of depreciation will always equal the total equivalent loan repayments :

$$\sum_{t=o}^{N} (S_t - D_t - A_t) = o. \text{ "}$$

BEECHY [15,p770]

BEECHY then proceeds to illustrate the equivalence of the two models using numerical examples [15,p771/72] which demonstrate that their respective before and after-tax procedures will always produce the same yield. However, in a later paper by DOENGES [38], he suggests that current tax practice in the U.S.A. would normally indicate that the after-tax yield will typically be higher than the (tax adjusted) before-tax yield; and in consequence the former mode of analysis is to be prefered by management.

> "While it is possible for the after-tax cost of leasing to equal the before-tax cost multiplied by one minus the tax rate, the occurrence of such an event is unlikely. Differences between imputed lease principal repayments and depreciation charges and differences between residual and book salvage values, resulting in variations of the tax shield effect, require the use of (the equation below) in calculating the cost of leasing."
>
> DOENGES [38,p36]

Thus, the after-tax IRR of leasing versus purchasing can be determined as follows :

DOENGES [38,p35]

$$0 = P - \sum_{t=1}^{N} \frac{L_t}{(1+r)^t} + \sum_{t=1}^{N} \frac{(L_t - D_t)T}{(1+r)^t} - \frac{R_N}{(1+r)^t}$$

It will be recalled that this equation is the same as that presented by BRIGHAM [21] but with the signs reversed. Although DOENGES does not contribute to the IRR methodology he nevertheless offers a clearer insight into the implications of the algorithm and its sensitivity to changes in the data imputs to the model.

"First, it is likely that because of the lost depreciation tax shield, a lease that is otherwise comparable to a debt arrangement will often bear a higher cost. The result will be a higher weighted average cost of capital. Second, the tax rate in effect will clearly affect the relative desirability (in terms of IRR cost) of leasing and borrowing alternatives. Because of the tax effect, the cost of debt tends to increase with a decrease in the tax rate, since i(1-T) increases as T decreases. In the case of leasing, however, the effect of a decrease in the tax rate is at least partially offset by the fact that, although the term L(1-T) will increase, the term DT will decrease as taxes decrease. As a result leasing should become relatively more desirable when compared to borrowing as tax rates are lowered; and vice-versa as tax rates increase. Finally,[1] ... the less accelerated the depreciation method the ... lower is the after-tax cost of leasing, and thus a lower weighted average cost of capital (will result), with the reverse holding true for a change to a more accelerated method of depreciation. "

DOENGES [38,p37/8]

Progress in the literature of IRR models is perceptibly slow in comparison with the contemporary evolution of NPV algorithms. A late article by FINDLAY duplicates the sensitivity analysis presented above, confirming its conclusions, and proposing a simple extension to DOENGES' procedure by allowing for prepayments of the lease instalments, operating savings (O_t) and salvage value. Thus :

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1. MITCHELL [99,p314] made the same point earlier, noting that "accelerated depreciation makes leasing relatively more expensive."

FINDLAY [55,p233]

$$0 = (P-L_o) - \sum_{t=1}^{N-1} \frac{L_t-(L_{t-1}-D_t-O_t)T-O_t}{(1+r)^t} + \frac{(L_{N-1}-D_N-O_N)T-O_N-R_N}{(1+r)^N}$$

The only feature to distinguish this equation from its precedents - save the alteration to the initial cash-flow - is the final term which "would consist only of the tax shield, operating savings and the salvage value of the asset lost through leasing. " [55,p233]

Coming inbetween the two previous contributions is a model by ROENFELDT & OSTERYOUNG [117] which introduces a new aspect into IRR decision procedures : vide "certainty equivalents". R & O argue that the techniques of VANCIL & BHW produce two different costs for a lease because they utilise different borrowing opportunity rates for the debt comparitor : yet nothing has materially changed in the lease itself. As such they contend that the cost of a lease should be structured and determined independently of the borrowing rate [117,p76]. They feel that the model proposed by BEECHY is an improvement on NPV-type analyses, nonetheless they note of BEECHY'S method :

> "The lease cost is still sensitive to interest rate changes, the interest costs and associated tax shields are discounted at the two different rates, and the cash-flows are unadjusted for risk which renders the calculation of the effective percentage cost difficult to interpret. "
>
> ROENFELDT & OSTERYOUNG [117,p77]

R & O recommend a model which has the following features :

"First, the expected operating costs that would be incurred with a purchase but which are included in the lease payment must be subtracted from the lease ...

Second, the tax shield from depreciation must be added to the after-tax lease payment ... the depreciation tax shield is a penalty or opportunity cost because the asset is not purchased.

Third, the salvage value is adjusted for risk by multiplying it by a certainty-equivalent coefficient or risk-adjustment factor α_t. "

ROENFELDT & OSTERYOUNG [117,p78/9]

Thus, their model establishes "r" the after-tax adjusted cost of leasing and compares it with the after-tax borrowing rate :

ROENFELDT & OSTERYOUNG [117,p79]

$$0 = P - \sum_{t=1}^{N} \frac{(L_t - \alpha_t O_t)(1-T) + D_t T}{(1+r)^t} - \frac{\alpha_N R_N}{(1+r)^N}$$

R & O consider the advantages of this method to be :

"First it focuses exclusively on the financing decision without intermingling it with the investment decision. Second, only those costs which are relevant to the method of financing are considered, and all the costs are evaluated on an after-tax basis. Third, the cost of leasing is insensitive to changes in the interest rate on borrowing. Finally, all the costs are adjusted for risk which permits a meaningful calculation of one percentage cost for each financing alternative. "

ROENFELDT & OSTERYOUNG [117,p79]

The problem of risk adjusted cash-flow was discussed when the leasing paper by SCHALL [120] was reviewed earlier. However, it is worthwhile to make one additional point concerning the implementation of R & O's proposal. In a numerical example they "assume a certainty - equivalent coefficient of 1.0 for maintenance and insurance costs each year and 0.9592 for the salvage value in year 6." [117,p79]

The writers give no indication of the method of estimation, origin or rationale behind the coefficient for salvage value -- which, at an accuracy of four decimal places, must surely be considered absurd in the confines of practical application.

Thus far no comment has been made about the possible repercussions of a lease cash-flow series with multiple rates of return : what TEICHROEW, ROBICHEK and MONTALBANO [128] have termed a "mixed project." There has been a brief exchange in the literature between MITCHELL [99,p309] and BEECHY [15,p772/3] on the problem of multiple returns, but it was adjudicated to be "substantially irrelevant to the problem of lease evaluation " [15,p773]

This view is not shared by the writer. Arguably this topic is of sufficient importance to warrant a full discussion of the consequences and implications of a mixed financing project and a review of the possible difficulties which may be encountered when evaluating the implicit yield of such a contract. As such, the matter will be pursued further during Chapter 8 when a relevant example will be devised using U.K. data.

6.4 CONCLUSION

Throughout this review of the leasing literature it has been possible to trace the development of various algorithms and models which endeavour to solve the leasing decision. However, one conclusion is clear at the completion of this exercise : no convergence of opinion or solution procedure has emerged. Various problems are present in the leasing decision which do not correspond with the 'normal' pattern established in financial theory of neatly isolating the investment and financing decisions. Four distinct controversies may be noted in summary :

1. There are those writers who argue that the I & F decisions should be conducted independently and in consequence the analysis of a lease rests solely on an appraisal of the financing decision.
2. Those writers who assume that an optimal debt-equity ratio exists and that any trespass of this ratio should attract a penalty cost ; this is the price the company must pay for using a lease.
3. Those writers who, in striving for an equitable "like-with-like" appraisal, construct often ingenious but none the less exceedingly complex repayment schedules for the debt equivalent ... irrespective of whether they exist or can be negotiated.
4. Those writers who reason that the leasing decision should be conducted with more than one discount rate in order to capture the different degrees of "riskyness" present in the parameters of the leasing cash-flows.

All of these approaches are at variance with the arguments presented in this Thesis and show a serious disregard for the critical interdependencies which abound in financial management. Outside the theoretical framework of "perfect markets" all of these arguments are redundant and subject to the criticism of "discriminatory analysis."[1] New approaches must be sought which have at their core a desire to solve the integrated I & F decision which characterises a lease appraisal.

One area of serious neglect in the extant literature is the almost total disregard of the circumstances which surround the decision to lease. Significant questions are :what is the relationship of the leasing decision to the remainder of the capital budget; what financing options are realistically open to the company; what rationale dictated the decision to lease the particular project in question and not another one which had been allocated outright-purchase finance; is the taxation strategy compatible with the leasing decision; what is the effect of the leasing decision upon the profitability of the (previously accepted) set of projects -- has the decision significantly altered the marginal efficiency of capital or the weighted average cost of capital, rendering previous NPV calculations incorrect and project ranking in error; and, finally, if leasing contracts have equivalent implicit costs does the shape of the repayment profile effect the decision criterion?

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1. See section 9.3,I, below

These issues have not been explored satisfactorily in the literature, if at all, which produces an underlying weakness in the appraisal methodologies. Arguably, this stems inter alia, from a serious deficiency of empirical evidence and understanding of leasing decisions in the practical environment. Consequently, the proposed models fail to encompass the richness of the leasing decision. As such the following Chapters will explore the questions raised and attempt to clarify them in relation to the total I & F decision set.

CHAPTER 7

THE USE OF LEASING FINANCE IN U.K. CORPORATE FINANCING STRATEGIES --- AN INDUSTRIAL SURVEY

7.1 INTRODUCTION

As was demonstrated in Chapter 6, normative discussion of lease evaluation abounds in the literature of finance, but there is a serious dearth of information on how U.K. corporate financial management actually perceives and uses this method of financing.[1]

The results and observations that follow are drawn from extensive industrial field research into the corporate use of debt and lease financing.[2] The study, carried out over the period January - July 1974, was divided into two parts.

1. A survey involving senior executives of 54 major corporations located in the U.K. who agreed to complete a questionnaire on their corporate financing policies and postures, and, in the majority of cases, to discuss their answers during subsequent interviews.
2. A survey involving the controlling management of 10 individual lease financing organisations based in the U.K.

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1. Although not directly relevant to the U.K. capital market, there have been two other studies of a reasonably similar nature in the U.S.A. (the first is now out of date -- although it is still frequently quoted in discussions on leasing -- and the second is of a somewhat specialised nature). The results contribute little towards our understanding of U.K. attitudes towards lease financing. See VANCIL & ANTHONY [132] and McGUGAN & CAVES [95.]

2. ACKNOWLEDGMENT. The researcher would like to thank the NORMAN-HOUBLON FUND, c/o THE BANK OF ENGLAND, for the necessary financial support to undertake this research field study.

The questionnaire and related interviews were later followed by more extensive discussions with representatives of leading U.K. finance houses and industrial banks at two seminars arranged at Warwick University in late 1974 : industrial representatives were also present at these meetings. The seminars performed an important function in the research programme, for they allowed the various ideas and arguments[1] which follow to be tested and modified to reflect the conditions and situations under which leasing is used in practice. Support for this mixture of the pragmatic and normative approaches is advocated by DONALDSON :

> "The normative researcher should look to descriptive research for assistance in identifying and classifying the problem and assessing the relevance of his results. The descriptive researcher should look to the results of normative research for help in identification of the relevant issues for exploration and for ideas as to how the present state of the art may be improved through logic and analysis [40, p12]... If the ultimate purpose of theory is to influence practice for the better, there must be both a descriptive and a normative model, which are capable of being linked together."
>
> DONALDSON [40, p34]

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1. Of particular relevance in these discussions was a thorough debate of the lease evaluation techniques to be described in Chapter 9.

The methodology adopted for the 'Lessee' survey was as follows:

1. A letter was written to the head of the finance function in each of the chosen companies explaining the nature of the research and asking them to write back to the University if they were interested in participating. In all 120 companies were contacted (selection of these companies was totally at random). The response rate of 45% was relatively high. In part this may have been because each company replying would receive a copy of the ultimate report, but also it was thought to be indicative of the concern with which management viewed the topics discussed in the survey.
2. When the questionnaire replies were received the participants were asked if they would be willing to expand their answers in a personal interview.
3. All interviews, with relatively few exceptions, were tape-recorded with the consent of the respondent and later transcribed. Each meeting lasting in general for between one and two hours; although in some cases it was considerably longer. The researcher had personal conversations (during the Lessee and Lessor surveys) with 7 Treasurers, 18 Finance Directors, 5 Financial Controllers, 6 Chief Accountants and 4 executives in other capacities.
4. All quotes are unaltered from the original, but for obvious reasons of confidentiality, the names or companies of the respondents are not divulged. (Confidentiality was particularly requested by the companies replying to the Lessor survey : the financial executives concerned were

particularly anxious that the resulting data should be well concealed if it was to be disclosed as part of the research. This wish has been complied with).

The 'Lessor' survey was conducted somewhat differently in that the questionnaire was mailed directly to the Leasing Manager of twenty major leasing organisations. Ten Lessors replied and all were interviewed. Because of the relatively low size of the sample an opportunity was taken to invite representatives of the leasing industry to two research seminars on the study. Both discussions were well attended and further detailed information was obtained.

The primary purpose of the Lessor interviews and discussions was to provide the researcher with information on how the leasing industry actually operated, from which it was hoped that the results would provide the opportunity to compare the attitudes and perceptions of both parties to the leasing contract.

In the following sections of this Chapter the more comprehensive, Lessee survey will be discussed first. This will lead to the identification of several leasing strategies which will go on to form the basis of the quantitative appraisal of lease financing which will be introduced in Chapter 9. The Lessor survey will be considered in the last half of this Chapter when various questions will be reviewed which mirror similar enquiries made in the Lessee survey. The important differences in attitude will be discussed.

7.2 THE RESULTS OF THE LESSEE QUESTIONNAIRE [1]

Using Capital Employed at the date of the last Balance Sheet prior to the questionnaire as an indicator, the distribution of respondents by size was as follows :

CAPITAL EMPLOYED (£M)	NUMBER OF COMPANIES
Under 20	15
21 - 50	11
51 -100	10
101 -500	12
500 plus	6

The widespread use of leasing is clearly demonstrated by the sample of companies:

Q11. "Does your company use, or has it used, leasing?

	In the last 2 or 3 years	Now	Actively considering
FOR PLANT AND MACHINERY	18	32	7
FOR GOODS VEHICLES	15	15	7
FOR COMPANY CARS	13	12	10
FOR ANY OTHER EQUIPMENT	17	17	10
NOT AT ALL	9	6	3

[1] The reader is reminded that some respondents would make more

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1. Part of this questionnaire, concerned with the Lessee's opinions and policies on Corporate Debt Capacity, have been discussed previously in the Thesis, see section 4.7 supra.

than one reply in their answers, whereas others would decline to answer a particular section. Hence, the aggregated answers will not always exactly equal the sample size of the companies. The interviews attempted to establish to what extent financial management in these companies :

1. Used leasing as part of a formal financing strategy, compared with its use as emergency financing.
2. Evaluated alternative leasing agreements, first against each other and secondly against alternative methods of financing.
3. Included leasing, as "off balance sheet" financing, in their evaluation of the debt capacity of their organisation (associated with this is the understanding which companies have of the perceptions of their external financial advisers in this matter ---- a subject discussed at length in the analysis of this section of the results in Chapter 4), and
4. Delegated, if in fact leasing was used in their organisation, the authority for its use amongst the different levels of the management structure.

I <u>INVESTMENT APPRAISAL AND LEASE FINANCING</u>

Considerable argument has been advanced in this Thesis in favour of integrating the investment and financing decisions of a company. This is especially relevant in the field of leasing where a joint decision procedure is deemed to be essential. However, the techniques used, and the degree of sophistication adopted in capital budgeting routines, varied widely in the

sample, from payback through accounting rate of return, to discounted cash-flow :

Q12 "Which of the following techniques are used by your company to evaluate capital proposals?"

	REPLIES
PAYBACK	15
AVERAGE PROFIT TO AVERAGE CAPITAL	10
DISCOUNTED CASH-FLOW	17
DCF + PAYBACK OR AVERAGE RETURN	21
FINANCIAL COMPUTER MODELS	7

Opportunity was also taken to investigate the forecasting routines used in corporate financial policy in order to obtain background information about how financing decisions are derived.

Q13 "In preparing financial forecasts for capital budgeting purposes, over what period do they cover?"

	REPLIES
ONE YEAR	13
ONE TO THREE YEARS	7
THREE TO FIVE YEARS	23
LONGER	5

Q14 "Do you base your financial projections upon?"

CASH FLOW FORECASTS ONLY	0
EARNINGS AND INCOME ONLY	0
BOTH OF THE ABOVE	35

It is worthwhile recalling one important observation that was made when analysing the results concerned with Corporate Debt Capacity in Chapter 4 : viz, the survey captured a period of change in Industrial attitudes towards debt strategy.

Further refinement of Questions Q13 and Q14 during the interviews revealed that for many of the smaller companies (<£50 M. Capital Employed) cash-flow forecasting was a relatively recent introduction and, because of the inadequacies of their data, it was generally confined to forecasts of up to one year.

An enquiry was made as to how companies would accommodate leasing agreements into their budgeting process.

For many of the companies interviewed, leasing, per se, was not considered as an investment decision at all :

> "The question to lease or not would come after the investment appraisal. Our first decision, to invest, is based upon outright purchase, we may then look at the lease arrangement for finance.
>
> Having committed ourselves to undertake the project, whether we lease or purchase becomes part of the financial appraisal, not part of the investment appraisal."

This is a clear separation of the investment and financing decisions; a methodology adopted by over 60% of the sample.

Of the rest, subsequent discussion revealed that any integrated decision process was carried out at a very superficial level or by routines which were frankly highly suspect as to their validity.

Q15 "When capital expenditures are presented for appraisal is it the company policy to calculate the investment ('spending') decision quite separately from the related financing decision?"

YES	NO
22	13

This is a disappointing result for two reasons : firstly, from the viewpoint of current developments in financial theory, it would appear that, as yet, very few industrial companies actively use any form of integrative techniques to solve the I & F decisions[1]; and, secondly, as the subsequent conversations were to confirm, even the leasing decision is not singled-out as a special case requiring some form of joint-decision analysis. There also prevailed considerable confusion in the minds of many of the respondents as to the 'correct' method to be adopted in the leasing decision, and the exact cash-flows to be used in the analysis.

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1. There are several other 'capital budgeting in practice' surveys in the literature : in the U.K., ROCKLEY [116] ; in the U.S.A., MAO [94] ; KLAMMER [82] ; PETTY, SCOTT & BIRD [112] and FREMGEN [57] . There is little evidence in any of these studies that integrated decisions models are being used; the only exception being "simulation" computer packages which use investment and financing data together, but not in a fully integrated decision procedure, vide CHAMBERS [30] .

Question Q16, gives some indication of the alternative combinations of cash-flow that are used in lease appraisal procedures.[1] The researcher, upon detailed enquiry, found that many alternative methods of lease evaluation exist in industry -- with almost every executive interviewed proffering a different opinion as to how a lease should be analysed.

Q16 "When considering lease repayments for project evaluation purposes are they treated as: "

	YES	NO
FINANCING CHARGES (similar to interest and banking charges).	9	13
OR. OPERATING COSTS	22	2
OR. PART CAPITAL & PART INTEREST	4	7

As will become apparent in questions, Q17 & Q19, many of the respondents did in fact generally undertake a <u>comparative study of the cost of leasing versus the cost of an alternative debt source</u> as their principal accept-reject criterion for lease financing. Judging from replies, Q7 & Q8 (see page 218 Chapter 4 : the question relates to the quantity of debt capacity on call to the company) it

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1. The chief purpose of this question was to see how many companies chose the third alternative (part capital & part interest) : this is the potential problem of 'discriminatory financing' which requires that the interest costs be 'washed-out' for a correct appraisal. Clearly this is infrequently done in practice.

was clear that the sample of companies had quite a depth of unused financial support available to them as a direct substitute for Instalment Debt.

Thus, alternative leasing plans would be evaluated against each other, and against a datum interest rate based upon the present incremental cost of the cheapest source of funds available to the company, which in general would mean their overdraft facility.[1] Question, Q17, is relevant here :

Q17 "When evaluating a lease proposal do you make the decision upon ?"

(a) Whether the interest rate implicit in the lease repayment is higher or lower than a specific interest rate (current bank rate for example)

YES	NO
21	4

(b) An aggregate of : lease repayments, operating costs and revenues generated by the project, clearing a DCF hurdle rate :

YES	NO
17	5

1. Companies were, naturally, concerned to determine the before-tax and after-tax yield of the lease contract or the alternative debt source. However, the after-tax rate of interest was frequently expressed by the simple convention i(1-t); where 'i' is the cost of the funds employed and 't' is the prevailing tax rate. It will be argued in Chapter 8 that this procedure can contain several errors --- the most notable of which are the problem of including or excluding the Capital Allowances, and the question of which debt sources and which cash-flow streams should be brought into comparison when determining the rival interest rates.

The, 'to lease or not to lease' decision process most often mentioned during the interviews is typified by the following quote :

> "Since the merger we have been well below the gearing we set ourselves. We have got 40 or 50 million pounds worth of borrowing capacity we could go for without getting over the top of our gearing. Therefore, the alternative has been, borrow more, or lease, just that.
>
> Thus we don't compare the leasing rate of return with our internal rate of return but against our outside borrowing rate. We compare it with the cost from the banks on fixed debt. It is a straight comparison of interest rates against lending rates. This criteria is very tough for leasing and has caused us to come out of it. "

One of the consequences of incorporating lease financing into the capital budgeting system is that instead of paying for an asset outright, the company only needs to produce sufficient funds to cover the first instalment. It could be argued, therefore, that the amount of capital saved [1] because there has been a decision to lease rather than to purchase, should, in some manner, be incorporated, or at the very least considered, in the analysis of the initial lease contract.

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1. This has been termed the RESIDUAL CAPITAL BALANCE which, in year 0-1 of a lease contract, is the difference between the initial capital cost of the asset and the first lease instalment. This important concept will form the basis of the lease evaluation technique to be proposed in Chapter 9.

To test this viewpoint the respondents were asked whether or not they performed such an appraisal, be it in qualitative or quantitative terms, and if so, were the relevant gains or losses attributed to the lease alternative.

Several of the financial executives interviewed did consider this a pertinent factor in their decision, albeit in an imprecise and qualitative manner. As such there was no evidence of any direct and unambiguous introduction of this return into the lease cash-flow analysis. As one finance director remarked :

> "I would consider the alternative opportunity created by the Residual Capital Balances; it is probably right to consider it as an incremental revenue brought about by the decision to lease.
>
> Our decision to lease in the first place was based on the fact that it would release funds for further use. "

Although it is not made explicit in the quote, this respondent practiced the lease strategy shortly to be described as "PLANNED FINANCING MIX". Under these circumstances it is here argued [1] that the RESIDUAL CAPITAL BALANCES concept is applicable and any resulting pecuniary advantage should be attributable to the leasing alternative.

Not everyone agreed however, they argued that the Residual Balances concept would depend upon their financial position at the time :

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1. Defence of this argument is delayed until Chapter 9.

"Its not attributable to the leasing deal. We have only been pushed into leasing because of the non-availability of other funds. Therefore, the remaining sum has not been available to spend elsewhere. "

Here the leasing strategy termed "SPILL-OVER FINANCING" is observed where the available funds to the company have become exhausted. In this situation no Residual Capital Balances can exist and therefore no additional advantage can accrue to leasing. The following section will consider the concepts of "PLANNED FINANCING MIX" and "SPILL-OVER FINANCING" in more detail, although the associated quantitative assessment of each strategy is deferred until Chapter 9.

II THE STRATEGIC USE OF LEASING

The research study has identified three major leasing policies adopted by companies in their overall financing strategies. Question, Q18, is indicative of the grouping of each strategy amongst the survey sample.

ONE: Leasing is to form an integral part of the corporate financial structure. As a result of this policy any capital expenditure presented for review could become a candidate for lease financing. This may be called the "PLANNED FINANCING MIX" strategy.

TWO: The company may decide to utilise leasing when other corporate funds available internally or externally, are otherwise close to exhaustion. This utilisation results from a gradual progression through other forms of finance in previous periods, with the company first

using those sources considered (on whatever grounds) to be cheapest, or sometimes the most readily accessible. Having reached the stage -- generally in between two capital budgeting exercises -- where, apparently, the only remaining financing capacity is lease financing, management takes the view that it must be used to fund some VITAL capital expenditure.[1]) This may be referred to as "SPILL-OVER FINANCING" because the 'pool' of capital expenditures accepted in the previous budgeting exercise plus the intermediate project about to be leased, will spill-over the reservoir or 'pool' of funds available.

Although the "SPILL-OVER"strategy may be viewed simply as a 'last resort' method of financing, the concept is more subtle than that. Rather it denotes the use of leasing on a temporary and discontinuous basis to obtain a much needed asset in the face of what appears

---

1. The financial circumstances surrounding the concept of "SPILL-OVER" have been observed by other writers, notably DONALDSON: although leasing has not always been used as a method of alleviating the problem : see [40, p30 & p75]. As part of a more general case study DONALDSON comments on one company : "With all existing external (financial) sources apparently at their limit of availability, with internal sources apparently incapable of handling alone the rising flow for current operations, and with new capital expenditure needed to consolidate gains made so far, the company appeared to be facing a difficult future in the battle for balancing funds flow."
[40, p152]

to be an acute capital shortage. As previously noted on page 225 of Chapter 4, there is an empirical study from the U.S.A., see ELAM [41], which suggests that leasing commitments decline as companies approach bankruptcy. As ELAM comments from his sample of bankrupt and nonbankrupt firms : "(My) prior assumption --- (which the research showed to be wrong) -- was that, while there was a general upward trend of leasing by all the firms, the weaker firms would be forced to turn to leasing to a much greater degree because of their weak financial position. That assumption followed from the theory that since a Lessor had a more direct legal claim to an asset than a lender, he would be more willing to lease to a weak firm that was unable to borrow money to buy the asset. " ELAM [41, p32] . The ELAM data in fact indicated that as firms approach bankruptcy their use of leasing was unchanged or slightly reduced. This, together with a vigorous denial by all the Lessors interviewed that they were not 'the last refuge of an improvident management' but in fact employed as rigorous a standard of creditworthyness as other financial institutions, would seem to dismiss the 'last resort' theory of lease strategy.

It may be thought that the use of leasing in "SPILL-OVER" conditions, although an isolated event, will nevertheless go on to form part of the (planned)

financing mix in future years, and clearly this is so. However, the essence of the "SPILL-OVER" concept relates to the intention at the moment of the financing decision and not its immediately subsequent administration.

One final point of clarification should be made concerning the previous discussion in Chapter 4 of the optimal exploitation and absorbtion of free cash-flow. The quantity of leasing used is 'planned' to correspond with the residual amounts and profile of the period free cash-flow which remains after the other principal elements of the debt portfolio have been taken into consideration. However, because "SPILL-OVER" leasing will take place between budgeting periods -- and therefore after the optimal investment and financing sets for that particular year have been selected -- it could have a detrimental effect upon the debt-supportive capacity of free cash-flow. This may mean, for example, that the company temporarily exceeds a debt-supportive constraint. However, as both the "SPILL-OVER" and "PLANNED FINANCING MIX" algorithms which follow in Chapter 9 are devised for the non-modeling, single financing decision situation, the quantitative (NVP) repercussions which result from each approach to leasing upon the debt-supportive capacity and

linkage concepts can neither be evaluated nor included in the decision procedure.

THREE: A by no means negligible aspect of financial management is the using of leasing as a TAXATION strategy.[I] All the companies interviewed who practised such a policy had as a common characteristic the fact that they were operating in a minimal or no tax liability situation. Such a condition generally resulted from a carry forward of substantial Capital Allowances from major capital expenditures in previous years. Any large capital expenditure now (such as a major addition to plant and equipment, or in certain cases an oil tanker, aeroplane or North Sea Oil facilities) would therefore derive little if any benefit from the attached Capital Allowances. There may indeed be a deferred benefit as the Capital Allowances become effective in future years, having been carried forward; although it was not always clear to the researcher that users of leasing as a taxation strategy had seriously attempted to quantify this;

I. The reader is asked to note that in general, and for the purposes of subsequent analytical techniques to be outlined in Chapter 9, the use of leasing as a "taxation" strategy may be assumed (on the basis of empirical observation) to be a sub-set of the "planned financing mix" strategy. The evaluation procedure will, therefore, be equivalent for both strategies; but in the "taxation" case the appraisal will be conducted using a zero tax rate (assuming that to be applicable). It is also possible of course, that leasing will be undertaken by a non tax paying company in "spill-over" circumstances, in which case the "spill-over" algorithm will also be enumerated using a zero tax rate.

however, if a series of major capital expenditures is anticipated during the coming periods, then there was a well-nigh indeterminate deferment.

If the asset is leased, however, the leasing company will retain the equity of the asset and, as such, they will receive the Allowances, thereby becoming a 'tax sponge' for the Lessee. In effect we observe the sale of Capital Allowances to the high profit sectors of the city : namely the Banks and Finance Houses. In return the size of the lease repayments are correspondingly reduced from what they would have been. This unique feature of leasing has undoubtedly been one of the prime instruments in the growth of the industry. But once more, the researcher was unsure that those employing this strategy had adequately traded-off the reduced value of the tax shield resulting from the reduced leasing payments, against the avoidance of a reduced value of Capital Allowances.

It will subsequently be argued that the capital budgeting techniques and lease evaluation procedures should be appropriately modified so as to reflect the true economic consequences of adopting a given leasing policy.

Replies to Question, Q18, implies that the "PLANNED FINANCING MIX" use of leasing is somewhat greater than the "SPILL-OVER" use of

Q18. "If your company used, uses, or will use leasing, do any or all of the following factors apply? "

	VERY RELEVANT	RELEVANT	IRRELEVANT
The need was/is/will be urgent, no other funds being available i.e. leasing is "EMERGENCY FINANCING".	7	4	28
Leasing is part of a "PLANNED FINANCING MIX".	17	12	12
Leasing is "SPILL-OVER" financing: i.e. Covers deficiencies or short-falls in planning.	7	6	25
Leasing is "OFF BALANCE SHEET" finance and so:			
(a) Does not affect borrowing capacity.	8	15	18
(b) Improves the apparent return on capital employed.	4	14	19
Because your company has very large capital allowances any new equipment would be unable to benefit fully from the 100% first year relief and so leasing was used as an alternative.	8	5	25

leasing, even when the latter use is stretched to include "EMERGENCY FINANCING."[1] However, care must be taken in interpreting what is meant by the utilisation of leasing as part of a planned capital structure. Strictly speaking, this means that a predetermined share of the total capital to be used during a capital budgeting exercise is comprised of lease financing. In section 4.5, supra, it was argued that the predetermined share of leasing is not established by reference to any Balance Sheet ratio. Rather, it is a function of the debt-servicing adequacy of free cash-flow after financial linkage has been optimised. It follows from this that the quantity of Instalment Debt to be employed in the capital budget is only known after the iterative routine has been completed. In fact, it was suspected that in many cases the "planning" was not this precise. It consisted more of a willingness to entertain the usage of leasing finance even though internally generated and immediately accessible external funds were not yet totally exhausted. Sometimes this was because the assets involved were known to be particularly acceptable to leasing companies so that the best terms might be anticipated; and sometimes because some major capital expenditure(s) which would require large amounts of internally generated finance was (were) in review, creating a wish to conserve such finance

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1. By definition, "EMERGENCY FINANCING" is a special form of "SPILL-OVER FINANCING". The common characteristic is that all other regular or familiar financial sources have been exhausted.

by the use of alternative sources of capital in suitable cases. [1] The former case has about it something of a note of expediency, whereas the latter is more indicative of a planning approach. Invariably the signal to lease originated at corporate headquarters as they were the only group with access to the company's overall financial situation, both at the time of consideration and for the future. Hence, there was a marked reluctance on the part of many financial executives to incorporate leasing within the innate devolution of any financing policy. The authority vested at divisional level would only extend to the choice of assets to be leased, with head-office adopting the role of internal banker.

> "When we look at our forward projections over the next 2 or 3 years we may see we are hitting our overdraft limit. This tends to take us into a position of capital shortage so we cut the proposals from the divisions to ensure that we will not be embarrassed. So because of this cut back the divisions have had to resort to looking at leasing. " [2]

Thus, the use of leasing was sometimes regarded as an activity initiated when the company has got to the limits of its 'normal' borrowing capacity and, due to a variety of reasons, just had to raise further finance. As one finance director replied :

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1. An example of the financial linkage and project re-scheduling procedures discussed in Chapter 4.
2. A clear example of "SPILL-OVER" financing, as is the next quote to follow in the text.

"If we were in a situation where we were getting up to our borrowing limits then we might get into leasing again. This is the only reason we went into leasing at all. Cash constraints and borrowing constraints were tight. We see leasing very much as fringe finance. We had projects that could not be funded by the cash we had available so we considered leasing. "

On average about three leasing companies were asked to quote for any particular contract with the quoted rates being very much subject to the processes of negotiation and bargaining between the two parties. This enables a very flexible lease repayment schedule to be arranged which can make significant contributions to the profitability of the venture and may ease cash-flow in the early years of an asset's life; furthermore, as was noted in Chapter 4, the facility for 'tailor-made' leasing schedules also assists in the process of financial linkage.

"We have persuaded some lease companies to quote us variable interest rate agreements : and equally to allow us to pay during the course of the lease at varying amounts. As such the meetings became a discussion and detailed analysis of what was most suitable to the both of us. "

As finance houses are competitive in the terms on which they offer lease financing, such flexibility of arrangement is an added boost to cash-flow planning and the optimal exploitation

of the organisation's debt-supportive capacity of free cash-flow. Furthermore, because the Capital Allowance associated with the asset accrues to the Lessor it becomes extremely significant, in terms of cost, to <u>establish the current tax position of the Lessor</u>.

"When we got into leasing for the first time on a big scale, £2.75 millions, the range of interest rates quoted varied enormously. This made us appreciate that the rate quoted by the leasing companies will depend upon when THEY can use the first year allowance and this may not always be in one year. Therefore you have to check which leasing company can pick up the immediate benefit. In the last deal we completed it was a sharing of the profits in almost precisely fifty-fifty. "

During the course of the Lessor interviews, several leasing managers indicated that their tax position was such that all their present leasing contracts were being priced on the assumption that only 50% of the first year allowance could be absorbed in the following year. Quite clearly, therefore, the above respondent's advice is a very important issue to consider when undertaking lease financing.

Not all the financial executives considered leasing to be a sound proposition. They reasoned (often, on their own admission without experience or evidence) that if the Lessor, as a third party, was introduced between the seller and buyer of an asset, then it must always be cheaper to purchase.[1] An alternative argument, generally put forward by the larger

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1. This attitude seems to have prevailed ever since the introduction of leasing into the U.S.A. -- the VANCIL and ANTHONY [13 survey noted this objection to leasing in 1962; see also VANCIL [135 p12/13]

international companies in the sample, was of the kind : "we can always obtain funds at a cheaper price than a leasing company, so why lease? "

As question, Q19, indicates, many companies continue to rely on imprecise perceptions and intuitive guesses, rather than economic analysis, when making the leasing decision. It is not too unreasonable to suggest that the term 'detailed comparative cost study' did in fact flatter some of the executives who professed to be employing it. Many respondents expressed doubts and concern about the procedures they were adopting; and many openly admitted that they had difficulty in calculating implicit nominal interest rates in, say, a monthly repayment lease schedule lasting five years.

Q19. "Do you consider leasing to be an expensive form of finance in relation to other sources? "

	YES	NO
(i) INTUITIVELY	25	6
(ii) BY DETAILED COMPARATIVE COST STUDIES	33	12

It is worth noting from the answers to question, Q19, that although a clear alternative choice was posed the total number of replies was 76, which exceeded the sample size. This evidence would suggest that the respondents used both guesswork and (some sort of) back-up analysis to evaluate the cost of a lease.

And, finally, the companies were asked the following question; (previous comments concerning this table, and the inconsistency of the results with others on debt policy have been made on page 215 of Chapter 4).

Q20. "If you consider leasing to be expensive have you any explanation, intuitive or reasoned, for the continued growth of leasing? "

A Blank space was provided.

TYPICAL REPLIES:

1. "It leaves conventional credit lines clear."
2. "Advantageous for small, growing companies with limited capital."
3. "No other source of finance available."
4. "Shortage of borrowing power."
5. "Spreads cash-flow."
6. "Inflation."
7. "Desire to have a better balance sheet."
8. "For reasons of tax management especially the 100% Capital Allowances."
9. "If funds available in short supply then business turns to leasing as an easy way of borrowing."
10. "Spreads capital spending without impinging on other facilities."

7.3 THE RESULTS OF THE LESSOR QUESTIONNAIRE

To the best of the writer's knowledge there has not previously been an empirical study (in the U.K. or U.S.A.) of how the leasing industry functions from the aspect of the leasing executive. It is assumed that this reflects the reluctance of many leasing companies to reveal information which may expose certain aspects of their commercial strategy to other members of the industry. Thus, a most significant constraint on the collection of a suitable sample of Lessor data is the extremely competitive market in which they operate, and the consequent heavy demands made on their time and skills. In such circumstances it is not to be expected that research contact can be made with many organisations, and thanks are indeed due to those leasing companies who co-operated in the research. Although the sample size of Lessors is only ten, it does nonetheless represent approximately 25% of the total industry[1]; and as shown in question[2], QL3, they comprise many of the larger Lessors in the U.K. capital market.

Questions, QL1 and QL2, were asked in order to obtain vital background information on the portfolio of clients each leasing organisation attracted. For example, some Lessors, notably No. 4 and No. 6, had their leasing business dominated by one or possibly two very large lease contracts; company No. 2 concentrated its activities only on "small growing businesses";

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1. There being about 40 leasing companies in the Equipment Leasing Association to which nearly all U.K. Lessors belong.

2. Note: the reference question numbers for the Lessor survey are denoted by QL ; as opposed to Q for the Lessee survey.

QL 1. "Using the capital employed categories shown below could you indicate the approximate distribution of your customers?"

CAPITAL EMPLOYED BY LESSEE	PERCENTAGE OF CLIENTS IN EACH CAPITAL EMPLOYED CATEGORY									
	COMPANY IDENTIFICATION NUMBER									
	1	2	3	4	5	6	7	8*	9*	10
£ 100m +	80%		20%		10%		50%			5%
£ 50m to £ 100m	10%		50%		30%	0.01%	20%			5%
£ 20m to £ 50m	10%		20%	2%	40%		20%			5%
£ 5m to £ 20m		20%	10%		10%	4.99%	10%			10%
£ 0m to £ 5m		80%		98%	10%	95%				75%

*not available

QL 2. "Could you please indicate how the total value of the assets you lease to customers is distributed?"

CAPITAL EMPLOYED BY LESSEE	PERCENTAGE OF LESSOR'S CAPITAL DISTRIBUTED FROM LESSOR TO LESSEE									
	COMPANY IDENTIFICATION NUMBER									
	1	2	3	4	5	6	7	8*	9*	10
£ 100m +	60%		30%		10%		60%			35%
£ 50m to £ 100m	30%		30%		30%	45%	22%			15%
£ 20m to £ 50m	10%		30%	50%	20%		12%			15%
£ 5m to £ 20m		20%	10%		20%		6%			20%
£ 0m to £ 5m		80%		50%	20%	55%				15%

*not available

*not available

QL 3. "What is the approximate valve of the assets leased out by your organisation in 1973, within the U.K.?"

COMPANY IDENTIFICATION NUMBER	TOTAL CAPITAL VALVE OF LEASED ASSETS	COMMENTS BY LESSORS
1.	£ 100m	"With commitment to £ 200m by 31 dec. 1973"
2.	£ 16m	"At cost"
3.	£ 25m	———
4.	£ 16m	"Those leased in total, not taken or in year"
5.	£ 13.7m	———
6:	£ 86.6m £ 35.0m	"= cost = written down value"
7.	£ 14.5m	"Written down value"
8.	£ 25.0m	———
9.	£ 39.0m	"Value of assets bought during year upto 30.10.73. Not w.d.v."
10.	£ 25.4m	Cost

whereas, companies No. 1 and No. 7 did the majority of their business with large -- "often blue-chip or household name" -- companies; and, finally, companies No. 3 and No. 10 adopted the deliberate policy of a diversified portfolio of Lessees.

Question, QL3, is merely a factual account of the leasing business undertaken by each of the Lessors in the year prior to the survey. Its purpose was to provide information upon which discussion of the later, more important, questions could be based. It also enabled the researcher to gain an initial insight into the 'bounds' on each company's leasing operation.[1] One very important factor must be stressed at this stage because it is believed to have an important bearing on some of the subsequent responses : many of the Lessors stated that the demand for leasing -- during the period immediately prior, and during, the survey -- was "phenomenal", "absolutely astronomic", "quite beyond our capacity to fund it."

Questions, QL4 to QL8, were included in the survey in an effort to obtain a more detailed understanding of the 'modus operandi' of actual business practice, the questions would provide answers not normally found in the literature.

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1. Was the bound established by reference to the quantity of funds available to the Lessor, the demand for capital by the Lessee, or the Lessor's -- or its parent's -- tax position?

Q L 4.

(i) "Is it company practice only to lease assets that may be defined loosely as 'middle of the road' (i.e. plant and equipment that is easily marketable because if is not too specialised or specific only to a number of industries)?"

(ii) "Or, are you prepared to lease any type of asset?"

COMPANY IDENTIFICATION NUMBER	REPLY TO PART (i)	REPLY TO PART (ii)
1.	YES, to strong lessees	YES, to certain lessees almost anything
2.	NO	YES, only so long as it attracts capital allowances
3.	—	YES
4.	—	YES, obviously there are items which are unacceptable
5.	NO	YES
6.	YES	—
7.	NO	YES
8.	NO	YES, providing that the lessee is financially sound and the capital valve above £ 1000
9.	NO	YES, to customers of suitable calibre and always providing that the asset is suitable for leasing
10.	NO	YES

Thus, as question, QL4, clearly indicates, it is the usual custom to lease any type of plant and equipment in which the Lessee may be interested. There would appear to be only minor provisions or restrictions as to the choice of asset -- which generally means that it must attract Capital Allowance, be reasonably easy to identify, and be leased to a 'reputable and creditworthy' Lessee.[1] /

Reply, QL5, confirms the widely held view that the majority of Lessors are willing to enter into 'tailor-made' lease contracts with their clients (this accords with the experiences obtained from the financial executives in the Lessee survey). It is quite noticable that both the Lessee and Lessor see this facet of leasing as an important "selling-point" for lease financing.

A number of Lessors commented that they would occasionally receive clients who had tried to negotiate other forms of debt but had been unable to obtain the repayment schedule pattern they desired, and as a result were searching for a Lessor who would be willing to write a contract to a given pattern.

One aspect of actual leasing practice that is not well documented, even within the Industry itself[2], concerns the 'Secondary Period' of a lease arrangement. Question, QL6, provides some detail, indicating that most of the Lessors provide a form of clause or stipulation that the Lessee may continue the contract for an indefinate period at a nominal -- "peppercorn" -- rental. The size of this payment is generally

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1. One Lessor noted : "We would not be interested in leasing equipment to certain companies (Computer Bureaus, Travel Companies, etc.) because we feel that these industries are not sufficiently stable at this time."

2. See pages 25/26, Chapter 1.

Q L 5. "In the negotiations with a customer do you allow 'tailor-made' rates of payment and/or interest rates to be made?"

COMPANY IDENTIFICATION NUMBER	REPLY	
1.	PROBABLY	
2.	YES	— for interest I read rentals
3.	YES	— rates of payment, not interest
4.	YES	— within reason
5.	YES	
6.	NO	
7.	YES	
8.	NO	
9.	YES	— rates of payment, not interest
10.	YES	

QL 6. (i) "Do you charge a 'peppercorn'.rent during the secondary period of the lease contract?"

	YES	NO
COMPANY No.:	2,3,4,5,6,7,8	1,9

(ii) "Or is the charge for this period based upon a fixed percentage of the size of the repayments in the primary period?"

	YES	NO
COMPANY No.:	1,4,9,10	2,7

(iii) "Or is it a fixed charge?"

	YES	NO
COMPANY No.:	1,2,6,7	4,9

set so that it will cover the various administrative expenses that are expected during the period. Alternatively, the Lessor sets the 'secondary period' rental at a fixed percentage nominal annual sum (generally not exceeding 5% of the primary period annual rental).

The second option open to the Lessee at the conclusion of the primary period is to terminate the contract and, as mutually agreed, allow the equipment to be sold. As can be seen in the response to question, QL7, the issue as to who actually disposes of the equipment is divided. Some leasing organisations which specialise in specific assets (notably, ships, aeroplanes, computers and transport fleets)[1] sometimes have a very comprehensive knowledge of the second-hand market for their assets and prefer to conduct the negotiations themselves. Other Lessors, who regard themselves merely as the provider of instalment finance, prefer that the Lessee disposes of the asset : in which case the funds obtained will be divided according to the original contract (generally on a 50/50 basis, but this depends upon the expected salvage value -- if it is very small the Lessee will keep most of it, if it is sizable amount then some proportional split is normal).

Thus, as a generalisation, the Lessee will typically receive a generous amount of the salvage value, if not all of it.[2]

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1. There are only a small number of 'specialised' Lessors. However, such is their understanding of the various products, that for example they would advise against leasing computer X, or aeroplane Y, if they thought the equipment did not achieve certain standards. They would not issue leases for such products.

2. One Lessor noted that they only retain "1/10th of 1% of the sales proceeds.

Q L 7. (i) "Do you normally dispose of the asset?"

	YES	NO
COMPANY No.:	1,3,4,5,9	2,6,7,8,10

LESSOR COMMENT ——

COMPANY No. 3 : Sold by lessee as lessors agent.
6 : Lessee disposes of asset and retains a °/o of the sales proceeds.
7 : Lessee disposes of asset and retains a °/o of the sales proceeds.
8 : Lessee receives a portion of the sales proceeds.

(ii) "Or, do you typically allow the lessor to dispose of the asset and keep this nominal figure?"

	YES	NO
COMPANY No.:	7,8,10	1,2,4,9

LESSOR COMMENT ——

COMPANY No. 10 : Lessee disposes of asset for a fee.

QL 8. "Do you permit modifications to be made to the assets once they are 'in situ' with the client?"

		YES	NO
NORMALLY,	subject to request and inspection	1,2,3,4,5,8,9,10	——
OCCASIONALLY,	subject to request and inspection	6,7	——
NEVER		——	——

In consequence, much of the concern expressed in the financial literature involving the expected opportunity loss to be incurred by the Lessee because he does not obtain the salvage value of the asset, is largely irrelevant in the U.K. market : although some exceptions may be expected, especially with large value assets on relatively short-term leases, in which case a suitable secondary period clause can usually be negotiated which does not disadvantage the Lessee.

Question, QL8, is once more a request for purely factual data regarding the modification to assets once they are with the Lessee. It was assumed that this would be an important factor to some industrial concerns who may wish to alter the asset during its life. For the majority of Lessors their only concern in such matters was expressed thus :

> "As long as they don't affect the value of the equipment, downwards, or make it unrecognisable, then the Lessee can do what he wishes providing that he informs us of any major (and not trivial) modifications. "

Of significant interest and importance to this research study was the credit assessment of the Lessee made by the Lessor. Some of the leasing companies relied on their parent Bank for the appraisal of creditworthyness, primarily because the potential Lessee held his normal trading account with the Bank and they already had a credit rating established. Thus, in a few cases, it would be normal operating procedure to exercise the same standards as would apply if the client was petitioning the parent for a medium term loan. However, the majority of Lessors interviewed were extremely concerned that they had

substantial autonomy over their credit policy, although, clearly, there were rules and guidelines issued by the parent to direct and limit any extreme action.

The answers to question, QL9, reveal a predominant concern for the traditional measures of debt capacity, namely the Balance Sheet debt/equity ratio. Debt levels (which, as may be anticipated, included any previous lease commitments) were supposed to accord with the "normally expected industrial average". Of almost equal importance to the Lessor, as an indicator of credit standing, were profits and profit trends. It was common during the interviews to be told that the Lessor took "an overall-view" : by which they implied that their credit department would "review all the evidence."

To gain a clearer insight into the replies given to question, QL9, it is considered worthwhile to summarise one of the major topic areas to emerge from discussions with Bankers of all sorts. It was observed that industrial lending is a function of five factors :

1. An assessment of the company -- size, technology, products and markets. Is it a business which seems to have a reasonable chance of survival if there is an economic downturn?
2. An assessment of the quality of the management as individuals : basically are they competent and trustworthy people?
3. Collateral and security.
4. A view of the future economy as a whole.
5. Instructions and constraints from Head Office.

Q L 9. "Which of the following indicators are you most concerned about when you review a prospective client?"

NOTE: The lessors were asked to rank their replies: 1 for the most important indicator; 2 for the next most important etc.,

COMPANY IDENTIFICATION NUMBER	RATIO OF DEBT TO EQUITY	PRIOR CHARGES COVER IN BALANCE SHEET	CURRENT ASSETS TO CURRENT LIABILITIES	FUTURE CASH FLOW PROJECTIONS	OTHERS
1					See notes
2					See notes
3	5	6	4	2	See notes
4					See notes
5	1		2		1. Profits
6	1	4	3	2	1. Profits 1. Capital structure
7	1	5	3	2	4. Profit trend
8	1	5	3	6	2. Profit record 4. Debtor/Creditor position
9	1	1	3	2	
10	2	3	4	1	

NOTES ON REPLY QL 9.

COMPANY IDENTIFICATION NUMBER	LESSOR COMMENT
1	"It is not possible to rank indicators. The assessment of a lessee for large capital equipment is specific to each lease and must be a total evaluation".
2	"Indicators (i) to (iv) are clearly important factors, jointly and severally. I decline to give a rating in general terms. Outside these factors one has to consider: the industry; the state of the economy; the asset itself and perhaps most importantly of all the management and trading record as an indication of the quality of the record."
3	"Rank : 1 Good past profit record for at least 5 years. 2 Good future prospects. 3 Stable industry : for instance we would not lease to travel companies and computer bureaux at present".
4	"This alone depends on the size of the contract. Accounts only reviewed over £ 5.000, varies greatly from business to business".
7	"Depends on size of transaction".
9	"Many others too numerous to specify".

Balance Sheet ratios, track record and forecasts are indicators of these factors which combine to form a scenario of the company -- it is an 'in toto' opinion. Thus, a detailed ranking of these indicators cannot be very specific or clear cut; an observation which is borne out by the replies to QL9. This is because:

A. Bankers and leasing executives do not think and operate in this way, for example one respondent noted : "It would be impossible to rank the indicators you have listed (in QL9) because each situation, each asset and each company is evaluated individually. "

B. The researcher suspects (but finds it difficult to prove conclusively) that, at the time of the survey, there was an atmosphere of change in the methods and criteria used in lending negotiations which had arisen out of the pressure of the prevailing economic conditions. The various leasing organisations were finding that their traditional credit rating policies were exposing them to an unacceptable level of bad debts and lease contracts in default. As such, the frequency with which "future cash-flow projections" appeared in the replies (as a second, or back-up, choice of debt capacity indicator) is significant : for it denotes the changing attitudes which predominated during the field research. The Lessors were, in fact, searching for a more accurate index of debt capacity. It was noted in Chapter 4 that today it is quite common for Banks and Finance Houses to request a cash-flow statement from their clients; in late 1974 however, this was by no means standard banking procedure.

It was hoped that question, QL10, would reveal that sufficient corporate cash-flow was an essential requirement for a successful lease application. The researcher was trying to establish what forward-looking indicators were used by the Lessor and, in particular, whether they employed any form of 'debt-supportiveness of cash-flow' constraint when they analysed the client's capacity to repay the instalments. In fact, the replies produced a variety of answers with profitability being the main concern of the Lessor.

In question, QL11, the respondents were asked to specify which factors affected the rate of interest charged to their client. The most prominent alternatives from the list provided were : (1) taxation and their capacity to absorb the 100% first year allowance; (2) current interest rate costs; (3) the financial status of the client; (4) future interest rates, and; (5) the amount of capital under consideration.

The significance of the Lessor's fiscal position was noted on several occasions:

> "A company dealing in financial leases must absorb the Capital Allowances <u>at the first opportunity</u>. It must also have regard to money costs. If it cannot do the first and ignores the second it will either lose money or become uncompetitive. "

> "When you speak of the amount of funds at our disposal you are really referring, in the first instance, to the level of <u>budgeted</u> profits by the Group as a whole.

QL 10. "Using the categories to the previous question (QL 9). Which indicator/s are you most concerned with over the period of the contract should a client transgress a figure you consider important?"

COMPANY IDENTIFICATION NUMBER	LESSOR COMMENT
1	"Again each factor could be important depending upon circumstances".
2	"The industry; management charges and gearing. But as lessors one can have little influence (save the ultimate sanction) once the lease is written".
3	"Any default in rental payments".
4	"Profit to Capital Employed".
5	"Profits".
6	"Profitability; D/E ratio i.e. over-commitment".
7	"Balance Sheet and future cash-flow".
8	"Fall in Profit levels".
9	"Concerned with all these factors but question is academic because a lease is a fixed contract and providing there is no breach, we have no right of withdrawal".
10	"Future cash-flow projections".

QL 11. "Does the rate of interest charged to your client depend upon any of the following categories?"

NOTE: The lessors were asked to rank their replies: 1 for the most important category; 2 for the next most important etc.,

	COMPANY IDENTIFICATION NUMBER										OVERALL	
	1	2	3	4	5	6	7	8	9	10	RANK [1]	POINTS[1]
THE AMOUNT OF CAPITAL UNDER CONSIDERATION		3	2	1		1				6	5th	19
A RATE DEPENDENT UPON CURRENT INTEREST RATES		3	3	1	1	4	2	1		5	2nd	36
A RATE DEPENDENT UPON FUTURE INTEREST RATES			4	1	1	5	2	1		3	4th	32
BY NEGOTIATION AROUND A PRE–DETERMINED LEVEL, IRRESPECTIVE OF THE COST OF THE ASSET TO BE LEASED			5				2				6th	7
THE EXTENT TO WHICH YOU CAN ABSORB THE 100 % ALLOWANCE IN THE FIRST & SUBSEQUENT YEARS		1		1	1	1	1	3		1	1st	40
THE AMOUNT OF FUNDS AT YOUR DISPOSAL						6				2	7th	6
THE FINANCIAL STATUS OF YOUR CLIENT		1		5	1	1	5	5	1	4	3rd	33
THE FINANCIAL PREDICAMENT OF YOUR CLIENT					5		6	5			8th	5
OTHERS								3*			9th	4

* Current rate of tax and future anticipated rate of tax.

1. If rank no. 1 = 6 points; rank no. 2 = 5 points; etc., then it is possible to allocate points to each category and make an overall assessment.

From this we make an estimate of our potential tax liability for the period. Given these two figures we are then in a position to assess how much leasing business we should undertake to shelter those profits. "

The second quote is believed to be indicative of the typical procedure followed by a Lessor when determining the quantity of business to be engaged in during a given year. It is quite normal for the Lessor to cease leasing after X months into the taxation year because he has exhausted the Parent's tax liability. Two other Lessor's noted on this important issue :

"We participate in two types of business here : financial leasing and industrial hire purchase (the latter, of course, has the Capital Allowance going to the hirer and not us). In general our H.P. rates are higher than our leasing rates. However, when we have consumed our taxable profits we then charge exactly the same rate for both sources of finance because we cannot benefit from the Allowance, and hence cannot offer tax-sheltered rates. "

"I would be very surprised if you found any Lessors in the market at the moment, there are just not the profits to spare. The North Sea Oil companies are currently mopping-up an incredible amount of funds; they soon suck-up all that's available. We are now in the situation where companies are almost placing advance bookings for future year's tax shelter. As such, many Lessors are badly over-extended

and are having to offer contracts which are priced on the assumption that they will only be able to absorb 50% of the First Year Allowance in the following year. "

The entire process of estimating the quantity of available funds is quite precarious because of its dependence upon the achievement of a predetermined level of profitability by the parent company. If an excess of profits is signalled towards the end of the fiscal year then it is always possible for the Lessor to solicit new business in an effort to absorb the over-budgeted tax liability. The more serious problem, however, is a possible shortfall in anticipated profits and a consequent reduction in tax liability. Because the pricing structure in the industry is fiercely competitive and the profit margin on each contract is not very large, all the excess leasing business will probably be rendered unprofitable because the receipt of the substantial cash-inflow, in the form of the Allowance, has been postponed to a later period.[1] It can be expected that the pressure on the leasing subsidiary to eliminate all, or nearly all, of the Group's tax liability has led many Lessors to exceed this figure and thereby produce some unprofitable leases. It is difficult to obtain a candid view on this topic as many Lessors regard it as a most delicate matter which must be restricted to the higher echelons of their organisation.

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1. The lease repayments will have been priced at a certain level on the assumption that the Allowance will be received at a specific date -- the earliest possible opportunity. If this cash inflow is delayed then clearly the discounted value will be reduced and the total NPV of the contract diminished. There will also be an effect upon the quantity of leasing that can be undertaken in future years if significant Capital Allowances are being carried forward. As a result subsequent periods will have a proportion of their tax liability already absorbed and as such the Lessor will have to under-

The preference shown in the rankings for the "financial status of your client" was said to mirror two things : the demand for leasing, and the consequent ability of the Lessor to pick and choose "only the very best", "most creditworthy" Lessees. There is a contradiction here however with the comments previously made to question, QL9, viz : the level of bad debts amongst the population of Lessees was running at unacceptable levels. It would appear, therefore that either : (1) the Lessor felt compelled to claim that all their clients were 'first class' when in reality this was not the case; or (2) there could have been a far higher failure rate amongst 'old' clients that those currently being accepted under the more stringent assessment.

Of particular interest in this research study was the composition of financial instruments used by the Lessor to fund leasing activities.[1] It had been thought that the Lessor would employ a balanced portfolio of equity, long-term debt and short-term debt. However, this proved not to be the case. It was noted in Chapter 1 that (according to a survey conducted by the E.L.A) 72% of the lease contracts issued in the U.K. last for between 3 and 5 years. The problem faced by many Lessors, however, was that during the period surrounding the date of the field research, they were experiencing great difficulties in raising funds to match this duration of contract.[2]

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1. Often referred to as the Lessor's "money-book."
2. They were having to break with normal fund raising practice and raise funds piecemeal : the Lessor going to the capital market for the required quantity of funds when each lease was agreed upon. All Lessors hoped that this situation would soon cease and they could revert once again to a more balanced capital mix.

As one Lessor noted :

"The difficulty today is that there is not a market for say 3½ year money which is the ideal fund to support a 5 year hire-purchase or lease contract. "

The existance of this gap in the market, at that time, has had a profound effect upon the leasing industry because it has forced it to rely (temporarily) almost totally on short-term finance.[1] Confirmation of this statement is to be found in the replies to question, QL12. Not surprisingly, therefore, many of the executives interviewed were extremely concerned that they were "borrowing short to lend long" in a very volatile capital market. Most of the Lessors in the sample (and the researcher was told that the same was true of other leasing organisations which were not questioned) were committed to a capital structure which comprised of 80-90% short-term debt.

The dangers inherent in such an exposed position were apparent to the senior executives in the leasing industry. Many pointed to the haphazard (sic) growth of leasing as the root cause of their current capital mix problems : if the pattern of demand had been more accurately predicted then perhaps they could have established a broader-based funding strategy which included a larger proportion of long-term capital and greater equity participation. As it is, their failure to anticipate the demand

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1. The long-term market for funds was equally unaccommodating : "The longer you make a 'loan' today the higher the coupon rate" -- private correspondence with the leasing manager of a U.K. Finance House, dated 31/12/74.

QL 12. "Which of the following sources of finance are used by your organisation to fund its leasing operation?"

NOTE: x = a yes reply; the percentage of each form of finance is shown in brackets when given by the lessor.

COMPANY IDENTIFICATION NUMBER	FORMAL DEBENTURE	LONG TERM BANK LOAN	SHORT TERM BANK LOAN	SHARE-HOLDERS EQUITY	PROFITS OF YOUR PARENTS	OTHERS
1	x	x	x	x	x	CREDIT AGENCY LOANS
2	x			x	x	EQUIPMENT PURCHASED BY PARENT
3					x (100%)	
4		x (10%)		x (7%)		ACCEPTANCE CREDIT/ SHORT TERM MONEY (83%
5		x	x			
6			x (84%)			DEPOSITS (16%)
7	x	x	x	x	x	DT I, EXPORT CREDIT OF SUPPLIER COUNTRY, INVESTMENT GRANTS
8			x (90%)	x (10%)		
9			x (11%)	x (10%)		DEPOSITS (79%)
10		x (10%)	x (10%)		x (80%)	

for leasing and the rapid changes in the capital market has left them totally unprepared : many of the Lessors were locked into a rising interest rate market with fixed repayment lease contracts which, as all acknowledged, was a recipe for extensive financial losses.

Concern over this 'structural' problem within the industry has brought to a head the demand for a new method of accounting for leases in the books of the Lessor.[1] Various arguments against the proposed Investment Period system have been made previously and will not be repeated here. Suffice it to say that the replies to question, QL12, seem to provide strong motivation for the industry to promote such a technique : although it has been questioned whether this method of reporting profit would remain germane if the Lessor's desired funding policy of a 'balanced capital mix' was to be achieved.

In an effort to obtain a comparison between the views of the Lessees and Lessors as to why leasing was or was not used, the questionnaire provided the opportunity for the Lessor to choose from a list of alternatives and indicate which factors in their opinion encouraged the Lessee to use leasing and which factors were influential in dissuading the Lessee from leasing. The responses are shown in questions, QL13 and QL14.

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1. Viz, the Investment Period method, see Chapter 2. This, firstly, assumes that the outstanding capital amount in each lease will be paid-off as quickly as possible (thereby attempting to match the repayment of funds originally raised for the contract) and, secondly, attempts to "front-end-load" the profits from the lease into the early years of the agreement.

QL 13. "Which of the following factors do you think encourages the lessee to use lease financing? Indicate with an * which factor you feel to be most important".

	COMPANY IDENTIFICATION NUMBER										
	1	2	3	4	5	6	7	8	9	10	TOTAL
THE GENERAL HIGH COST OF MONEY IN THE ECONOMY			1			1		1			3
IF A COMPANY HAS RUN UP AGAINST ITS CAPACITY TO BORROW FROM 'NORMAL SOURCES' IT WILL THEN TURN TO LEASING			1					1	1	1	4
THE CHANGES MADE TO THE FIRST YEAR ALLOWANCES, NAMELY TO 100°/o: WHICH THE COMPANIES MAY NOT BE ABLE TO ABSORB	1	1	1*		1	1	1*	1*	1*	1*	9
A COMPANY WILL LEASE BECAUSE IT HAS NO TAXABLE PROFITS – THEREBY EFFECTIVELY SELLING ITS CAPITAL ALLOWANCES TO YOU	1	1				1		1	1	1	6
LEASING ENABLES A COMPANY TO GROW AT A RATE FASTER THAN ITS INTERNALLY GENERATED EARNINGS WILL ALLOW	1*	1			1	1		1	1	1	7
A COMPANY USES LEASE FINANCING BECAUSE IT IS 'OFF BALANCE SHEET'			1			1		1		1	4

LESSOR COMMENTS:

1 : 'Off Balance Sheet financing is a very poor reason'.

2 : 'Costing, estimating and profit centre control. All these are simplified through leasing rentals. Also capital budgeting delegation is made easier, so long as used with discretion'.

4 : 'The above very much depends upon the size of the company, most large companies evaluate investment using, say, DCF. Smaller companies lease for ease of payment'.

QL 14. "From the list shown below, please tick which factors you think influence those companies who do not lease. Please indicate with a * which factor you feel is the most important.

	COMPANY IDENTIFICATION NUMBER									
	1	2	3	4	5	6	7	8	9	10
LEASING IS AN EXPENSIVE FORM OF FINANCE			1				1*			
LEASING IS NOT AN ESTABLISHED FORM OF FINANCE	1*	1*						1		
LEASING INVOLVES MORE 'SALESMANSHIP' THAN A DEBT RAISING EXERCISE FROM THE BANK			1*							
LEASING ALONG WITH OTHER DEBT, IS STILL CONSIDERED SOMEHOW 'IMPROPER' AND SHOULD BE AVOIDED	1	1	1		1			1		
COMPANIES SIMPLY DO NOT HAVE AN ESTABLISHED LINE OF COMMUNICATION WITH A LEASING ORGANISATION				1	1*			1*	1*	1*

OTHER REASONS (blank space provided for comment):

COMPANY No. 6 : (i) Companies do not lease because they have capacity to absorb allowances.
(ii) Companies are ignorant of the advantages of leasing.

COMPANY No. 4 : (i) Plenty of taxable profits *; and (ii) plenty of cash *.

COMPANY No. 7 : (i) Companies find leasing expensive when they have available tax shelter.

COMPANY No. 10 : (i) Companies have enough taxable profits to absorb the capital allowances on purchase of the equipment.

Two issues are dominant in the minds of the Lessors as to why companies lease : (1) TAXATION -- leasing is used as a principal aid in tax management particularly when no taxable profits exist; and (2) leasing is used AS A MEANS OF ALLEVIATING CAPITAL RATIONING. Of the other factors listed, "off balance sheet financing" scored relatively poorly, with many of the Lessors commenting that they thought it was a very unsatisfactory reason for leasing as any credit analyst would observe its presence and as such the 'off balance sheet' argument was totally neutralized.

Four of the Lessors were of the opinion that leasing was at times used as a form of 'last resort' financing, although on further questioning it was apparent that many Lessors were confusing 'last resort' with 'emergency' financing : where the Lessee wanted to obtain the asset quickly but all its lines of credit were currently at their limit, as such the Lessee could negotiate an increase in these limits (which may take a considerable time) or begin discussions with a Lessor in an effort to complete the transaction swiftly.

The response concerning the "general high cost of money in the economy" was lower than expected. It will be recalled from Chapter 1, pp47-49, where several alternative hypothoses were raised as to why the use of leasing was growing in the U.K., that it was suggested that perhaps the Lessee may be forced into leasing in a 'tight' money period because there were very few financial alternatives open. It would appear, however, that

many members of the leasing industry do not envisage themselves fulfilling this role in the money market.[1] Whereas, the Lessee (particularly the smaller companies who have less financial manoeuvrability) feels obliged to traverse across a list of debt instruments towards the more expensive tranches of finance -- which for the type of Lessee under consideration[2] meant reaching their overdraft ceiling, exhausting short-term bank support and as a result being compelled to use leasing if they wanted to fund further fixed assets. This discrepancy between Lessee and Lessor viewpoints may imply : (1) that the Lessor is reluctant to admit that leasing is used by some of their smaller clients as a final financing option; or (2) the Lessee can successfully disguise his motives for leasing, at least in part, by not disclosing the limited alternative financial sources at his disposal.

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1. This is perhaps an oversight by the Lessor in that no connection was made between previous statements that the demand for leasing was very high and the cause of that demand. Many Lessors assumed that it was the pressure on company profits (which had reduced the Lessee's capacity to absorb the Capital Allowances) which had led to the increased demand. It is argued here that rising interest rates also have the effect of making companies turn to other more expensive forms of finance, of which leasing may be one.

2. As was made clear in question, QL1, the typical size of Lessee varied enormously throughout the sample of leasing organisations -- thus it was almost inconceivable to think of a £100M+ capital employed company being 'forced' into leasing (although this was in fact the case with two of the respondents), whereas the more exposed financial position of the smaller companies interviewed often left them obliged to seek leasing or other instalment debt financing.

The following points may be made concerning the replies to question, QL14 :

1. The majority of Lessors are (understandably) resolutely convinced that once a client has experienced the benefits of leasing he will henceforth include it as an integral part of his financial structure. But, if a company has not previously tried leasing (or even entered into discussions about the possibility of doing so), then the Lessor feels that the Lessee will have a preconception about leasing and the Lessor which encompasses excessive salesmanship, misleading claims, sharp ("American"!) practices, and a host of unsubstantiated psychological blocks against the use of leasing which simply are not true. Given an opportunity to clarify their professional standards and attitudes, all the Lessors believed that the leasing industry would grow substantially to take in those companies whose current reluctance to employ leasing could be shown to be based upon mistaken beliefs and hearsay evidence.
2. Companies which have large reserves of cash will have little or no motivation to lease, preferring instead to use their own funds.
3. If a company has sufficient capacity to absorb the Capital Allowances which are being generated then (a) it will wish to reduce its tax liability by cliaming all the Allowances itself and not by selling them to the Lessor, and (b) the tax sheltered leasing rates being offered will, as a result, not be competitively priced for a company with taxable profits.

4. Several Lessors commented that their client often needed assistance to calculate the true rate of interest on a contract, from which they conclude that criticism of leasing rates was often based on presumption rather than fact. As one Lessor noted : "Leasing is expensive but not necessarily more expensive than other forms of finance. "

Finally, an opportunity was taken to enquire on what basis the sample of Lessors would suggest lease financing to a client rather than other forms of Instalment Debt. It was hoped that this would reveal how the Lessors viewed leasing's relative strengths and weaknesses in comparison with 'similar products' on the money market. See question, QL15.

Half the respondents were concerned to stress the taxation advantages enjoyed by leasing as being one of the prime benefits to the Lessee. The ability to offer what were in effect privileged interest rates to those companies who could not absorb their own Capital Allowances was clearly seen as a major attraction. From the remainder of the sample (particularly companies No. 3, 7 & 9) rather terse and disappointing replies were provided [1]: in the subsequent interviews it was to transpire that these companies did not consider other forms of Instalment Debt to be in competition with leasing and as such had answered the question in a rather negative way.

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1. Perhaps this is only to be expected in the last question of a research study given to busy financial executives.

Q L 15. "On what basis would you suggest leasing to a prospective client rather than, say, conditional sale or hire purchase?" (blank space provided for comment).

COMPANY No.	COMMENT
1	"They are completely different financially, under U.K. law capital allowances would only be available under a strictly written lease agreement".
3	"We do not offer those services".
4	"At the present time due to taxation factors our rates for leasing and industrial hire purchase are exactly the same. Normally the decision would be made with regard to profitability and borrowing facilities".
5	"It would depend on so many circumstances that a short answer is not always possible".
6	"Capacity to absorb allowances plus debt/equity on Balance Sheet unaffected".
7	"Always leasing. We don't involve ourselves in any other form of financing".
8	"Depends upon lessee's tax situation".
9	"When it appeared to be more beneficial to the customer than the other facilities we offer".
10	"When the company does not have sufficient profits to absorb the capital allowances".

One last point may be made regarding this question and financial linkage. The concept was not familiar to any of those interviewed, but upon a brief explanation of the potential role of leasing in working capital management and the ability of free cash-flows to be pledged for further instalment debt, there was a positive response that many of their clients engaged in leasing because :

(i) it provided a means of instalment payment and thereby spread the initial cost over several years;

(ii) it helped stabilise cash-flow demand;

(iii) it meant that working capital levels could be maintained rather than reduced for outright purchase capital expenditure; and

(iv) it provided the opportunity to commence production now rather than having to wait until funds could be raised internally.

Thus, combining this rather fragmentary evidence, it is possible to suggest that the concept of linkage which has previously been outlined does in fact represent a formal rationalisation of observable industrial practice; although it would appear that linkage is infrequently optimally exploited by the Lessee.

7.4 CONCLUSION

It has previously been noted in Chapters 3 and 4 that the use of debt financing by U.K. companies has grown with remarkable speed in recent years. A significant aspect of this development in the capital market has been an ever increasing trend towards the use of Instalment Debt by industry.

Leasing does face psychological barriers to its ready and efficient utilisation however. The feeling that it is somehow an 'infra dig' source of funds still apparently persists in some quarters. It is argued both by the researcher and many Lessors that such barriers are often based upon irrationality and a lack of sound analysis. In the period since the Lessee survey was undertaken this resistance to leasing has notably eased, mainly due to an increasing familiarity with it and the continuing requirement by companies for externally generated finance.

It is perhaps understandable that leasing has only reached maturity as a source of corporate funds in recent years : this failure may be ascribed to the poor quality of advertising literature for leasing in the past and the superficial treatment of lease financing in the academic and professional journals where (with a few notable exceptions) it has continued to be depicted as a straight financing decision when in fact it is a far more complex problem requiring an integrated investment and financing decision.

There often appears to be an implicit assumption in much of the writing on lease appraisal that the leasing decision takes place in an unidentified and rather vague corporate world : one which is assumed to exist in isolation from the normal capital budgeting process and one which does not reflect corporate reality or explain the causes behind the use of leasing. As has been shown, different leasing policies exist in practice (vide : "Planned Financing Mix",

"Spill-Over" and "Taxation") which are a product of the financial circumstances facing the company. It is important that the implications of this new empirical evidence should be embodied in appropriate analytical techniques developed to quantify the effects of undertaking a given strategy. That the analysis of a lease is <u>situation dependent</u> adds a completely new dimension to the problem. Of major importance to this classification of leasing strategies in the introduction of the concept of Residual Capital Balances. It has been argued that this is an implicit and necessary factor which should be incorporated into the decision process : further consideration of this topic is undertaken in Chapter 9.

Thus, in summary the Lessee field research suggested:

1. There was a strong and growing use of leasing by the sample of companies.
2. The capital budgeting procedures of the majority of respondents indicated a clear separation of the investment and financing decisions.
3. The evaluation of a lease was frequently inadequate and unsatisfactory in practice : often taking the form of a simple financing decision comparing the cost of leasing with the cost of overdraft.
4. Delegation of the leasing decision generally conformed to the following pattern : (i) the submission of divisional capital budgets which exceeded the available capital; (ii) the signal from head-office for the divisions to lease a given quantity of assets; and (iii) the selection of which assets to lease by the division.

5. The "off balance sheet" argument in favour of leasing ("it leaves conventional credit lines clear") was occassionally suggested by the Lessee as an important factor; while this may have a marginal influence on gaining extra credit in the short-run, it will certainly be taken into account by Banks and Finance Houses if the quantity of leasing increases and, as such, no real advantage can exist.
6. Three leasing strategies were observed : "Planned Financing Mix", used as a general part of the company's capital structure to spread cash-flow and ease capital rationing; "Spill-Over" financing when leasing is used in-between capital budgets when other funding sources are apparently exhausted; and "Taxation", when leasing is used in a no tax-liability situation.
7. The newly introduced concept of Residual Capital Balances was occassionally considered by some of the Lessees albeit indistinctly. No evidence was forthcoming to suggest that any of the sample of companies had examined the influence of Residual Capital Balances on alternative lease contracts, nor had there been any attempt made to quantify their impact on the leasing decision.

It will be recalled that one of the main objectives of the Lessor survey and field research was to gain an inside knowledge of the modus operandi of the leasing industry, which hitherto has not been made publicly available. However, a major problem (which it is felt will always be present in any analysis of the U.K. leasing industry) is the difficulty of obtaining a homogeneous population of Lessors from which the researcher can draw comprehensive conclusions.

This arises because of the diversity of leasing organisations : some Lessors specialise in multi-million pound contracts with very large companies; others act as financial intermediaries between the Lessee and a consortium of companies acting as joint Lessor; while others concentrate upon relatively small clients who lease assets valued in a range from, say, £1000 to £50,000. As such, the researcher must take care when summing-up and synthesising the data because the objectives and attitudes of the sample of Lessors are liable to differ quite significantly. With this caveat, therefore, certain overall conclusions can be drawn :

1. There was an exceptional demand for leasing during the period of the survey. This is assumed to have two principal causes : (i) company profits were under pressure which reduced the available tax shield, thereby making it difficult to take full advantage of any Capital Allowances, as a result companies turned to leasing for taxation benefits; (ii) companies were faced with very high money costs, heavy drains on working capital and many of their debt sources fully exploited -- and so in order to support further fixed investment they turned to leasing.
2. The Lessee can expect the following : 'tailor-made' lease contracts, advantageous secondary period terms, and a significant proportion of the ultimate salvage value of the asset on termination of the primary period.
3. At the time of the survey a client's debt capacity was generally established by reference to debt-equity ratios and

profit trends. However, many of the Lessors were changing to cash-flow forecasts and indicators as a more accurate method of assessing debt bearing capacity; today cash-flow forecasts are almost standard credit assessment procedure.

4. The monetary level of leasing business undertaken by the Lessor (that is, the total amount of assets leased in each year) is constrained by the Group's taxable profits. Most leasing companies were established to shelter their parent's tax liability.
5. Many Lessors consider that leasing's principal attraction to the Lessee is the taxation advantages it enjoys. Other points in favour of leasing briefly are, ease of payment and the relief of capital rationing.
6. The rate of interest charged by the Lessor depends upon the prevailing interest rates and the group's current tax position. If taxable profits still exist to be relieved then the Lessor can offer "tax-sheltered" rates; if the tax liability has been exhausted then the Lessor will either cease leasing or charge 'ordinary' -- non tax-sheltered -- rates.
7. At the time of the survey the Lessor's capital structure was in general very heavily biased towards short-term debt. This is potentially most dangerous as it leaves the company exposed to fluctuations in money costs. Attempts were being made to correct the balance back towards more long-term debt and equity. However, during the survey this objective was being frustrated because many Lessors reported that they were having difficulties obtaining long term funds.

CHAPTER 8

INSTALMENT DEBT FINANCING TABLES TO DETERMINE THE NOMINAL INTEREST RATE OF A LEASE CONTRACT : ISSUES AND CONTROVERSIES.

8.1 INTRODUCTION

In the previous Chapter concern was given to a field research study of the use and appraisal of lease financing by U.K. based companies. It was demonstrated that many financial executives evaluated lease agreements solely on the basis of establishing the "implicit" interest rate of the lease contract. Evidence was also forthcoming to suggest that this rate would be compared with the cost of the cheapest source of finance available to the company; which on further questionning usually implied the cost of an overdraft facility or less frequently a term loan.

While it will be argued in Chapter 9 that the evaluation of a lease requires a more rigorous analysis of the contract than a comparison of competing interest rates, it is clear that a set of before and after-tax interest rate tables would be a valuable aid to the practitioner. Such tables could be used in a "ready-reckoner" fashion to establish the interest cost implicit in a monthly or other periodic repayment schedules for a leasing contract.

The result of a comparison of that cost with some other debt instrument will depend upon how the two sets of cash-flow data are specified. Closer consideration of such specifications reveals potential areas of controversy. An important issue to decide is whether, when establishing the internal yield of a contract, the opportunity cost of the Capital Allowances foregone (because the company has leased rather than bought outright) should or should not be included in the appraisal.

In order to answer this problem it will be necessary to reconsider the list of alternative cash-flow specifications which could be applied to an Instalment Debt contract. This leads to a more precise understanding of the cash-flows which should be compared with each other in a current 'lease or borrow' implicit interest rate anlaysis. It is argued that these are generally specified incorrectly in practice. The remainder of the Chapter is concerned to discuss the analysis of a 'mixed financing project' which may occur when appraising a lease cash-flow schedule.

8.2 OBJECTIVES AND ASSUMPTIONS

From the empirical study it was clear that businessmen wished to ascertain the before and after-tax yields on a lease agreement for two reasons :

1. So as to facilitate a comparison between the cost of two or more leasing contracts, possibly with different repayment schedules and time periods; and,
2. To establish the yield of a lease contract in order to compare it with the cost of bank overdraft finance.

Thus with this objective, a set of Tables have been constructed (shown in Appendix No. 1 at the end of the Thesis) which will enable the Lessee to determine the interest rate yield simply and efficiently. The Tables cover lease schedules lasting up to 12 years in duration, and are designed for lease agreements with constant periodic repayments. Thus, subject to the argument which is about to follow, the Tables may be used to find :

1. The 'before-tax' nominal interest rate on the contract.
2. The 'after-tax' nominal interest rate on the contract.[1]

   Two groups of Tables have been constructed for the after-tax rate in order to take account of the different way in which businessmen specify the cash-flow profile of the debt instrument that is to be compared with leasing.
3. With a small additional calculation the nominal yield thus derived can be converted into the equivalent 'implicit' interest rate of the lease contract.

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1. Numerous articles in the literature of lease appraisal suggest that the correct analytical procedure is to calculate the IRR (the implicit interest rate) of the lease on a before or after-tax basis. Most authorities suggest an after-tax basis; typical writers who make these proposals are : BEECHY [14 & 15]; CHASTEEN [31 & 32] FINDLAY [55]; WYMAN [148 & 149]; DOENGES [38]; QUIRIN [113] and MITCHELL [99].

   However, these analyses do not take into consideration the significant influence of the U.K.'s Capital Allowance system on the decision comparison. This Chapter redresses that omission. It is stressed, however, that the correct analysis of a lease requires a more detailed evaluation (shown in Chapter 9) than simply establishing the IRR of the contract.

I. PRIMARY PERIOD ASSUMPTION

A typical financial lease consists of a primary period which is N years long -- during which the Lessor recovers the initial cost of the asset less any associated Capital Allowances, plus his profit -- and a secondary period which will commence on the termination of the primary period. It is generally accepted that an interest rate analysis will only be concerned with the repayment schedule in the primary period because :

1. The rentals paid in the secondary period are monetarily insignificant, commonly taking the form of a nominal rental.
2. The contract may be terminated during the secondary period at comparatively short notice by the Lessee, making the length of this period indeterminate; and,
3. the rentals occur at a sufficiently distant period as to be immaterial in discounted cash-flow analysis.

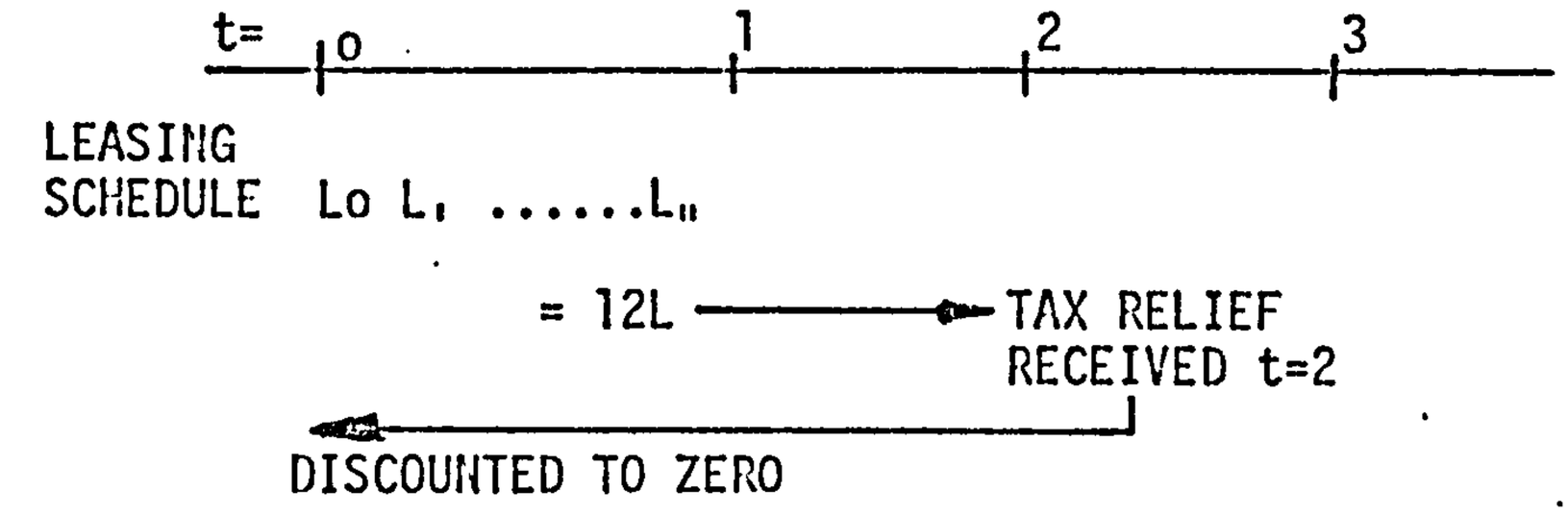
II. TAXATION ASSUMPTION

The following two conventions have been adhered to in the preparation of the after-tax tables:

1. The rate of Corporation Tax is taken at 50%
2. In common with other analysts working in the field of project appraisal, it has been assumed that a one-year tax delay occurs after the end of the accounting year, in the receipt or payment of taxation amounts relating to that year.

The latter convention requires closer scrutiny in the case of leasing contracts because they can be expected to involve payments in advance : that is, the initial payment

is at t=o. It has been assumed that t=o corresponds to the first day of a new accounting year for the Lessee. Given a one-year delay convention, the lease payments will earn tax relief at the end of the following year (t=2) : that is, one year elapses before the payments are entered into the accounts and a further year goes by before they receive tax relief.[1] (The equivalent two year delay period also applies to the receipt of Capital Allowances). To illustrate this point using monthly repayment :



8.3 THE BEFORE TAX YIELD

The following expression is considered to hold for Instalment Debt contracts:[2]

$$p = \sum_{t=o}^{N} \frac{L_t}{(1 + \frac{i}{m})^{m.t}}$$

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1. From the empirical research it was clear that this two year deferment is frequently overlooked by many U.K. analysts.

2. See REINWICK [115, pp95/96].

NOMENCLATURE :

Let p = Initial Cost of Asset

L_t = (Constant) value of each period lease repayment

i = Nominal period interest rate on the contract

N = Length of contract in years

m = Number of period lease repayments per annum.

It will be noted that this expression makes use of the function i/m to give the period compounding rate where there are m periods per annum. For example, if quarterly periods are considered then for an annual interest rate of 12% the quarterly period rate would appear to be 0.12/4 = 0.03%. In fact, the Tables which subsequently derive from this basic formulation make use of the Banking and other Finance House convention that the 3% rate thus derived will be used as a quarterly compounding rate. This gives an annual interest rate somewhat in excess of 12% : specifically it is $(1 + 0.03)^4$ = 12.55% To repeat, this is the common practice in respect of Bank Overdraft and other forms of debt finance arranged through Finance Houses. It is possibly salutary, therefore, to reflect that the phrase, "Overdraft at 3% above Bank Borrowing Rate (9%) = 12%" really only reflects a true borrowing rate if this interest is computed on that facility at annual rests. If interest is computed at 1% monthly rests then the resulting true interest cost is 12.68%. To achieve a true compound rate of 12% p.a. on monthly rests, the monthly interest rate to be charged is approximately 0.93%. However, in these Tables the ordinary Bank/Finance House convention has been followed.

Thus, in using the Tables, it is important to realise that the interest rate which is revealed is slightly lower than the true rate of interest which is implicit in the contract under review. It is, however, still necessary to know this nominal interest rate in order to compute what the period compounding interest rate implicit in the contract really is. A little additional calculation will then reveal the true implicit interest rate : for example, using Table 3 of the Appendix ("Half Yearly Repyments with zero percent tax") it may be asked what is the nominal interest rate implicit in a leasing contract which requires 4 semi-annual payments of £500 to finance a capital asset costing £1800. As will be explained in the text which follows, the method of using the Tables is to express the payments as the divisor of the capital sum and to seek the resulting quotient in the applicable Table, here the relevant Table is No. 3. Thus, £1800 ÷ £500 = 3.6, on Table No. 3 the factor of 3.6 is to be found at the co-ordinates : "No. of rentals = 4 " on the horizontal axis and "Interest Rate = 15% on the vertical axis.

Hence, the nominal interest rate of the contract is 15%. If the Lessee were to ask the Lessor what was the interest rate on the contract the Lessor would in the majority of cases reply 15%. In point of fact it is slightly more than 15% because the rentals reflect the fact that interest is calculated semi-annually on 15/2 = 7½% per six months. Expressed as an annual rate this is equal to $(1 + 0.075)^2 = 15.56\%$, the real rate of interest.

The Tables have been expressed in this way so as to correspond most closely with existing U.K. Banking and Finance House practice. Conversion of the nominal rate used in practice to the real rate, involves the simple additional calculation illustrated in the previous paragraph.

Returning to the equation, it will be noted that when solving for i the capital benefit received is being equated with the leasing premiums paid, with the repayment schedule being prior to the receipt of tax relief by the Lessee. However, the L series of cash-flows is commonly, not strictly a before-tax figure: in fact, the size of the periodic rentals have been distorted through the lessor "leaking back" his receipt of the asset's Capital Allowance to the Lessee by way of a reduced premium.[1]

Thus, strictly speaking, L is a tax affected series.

The 'true' before-tax yield on the lease contract in a more rigorous analysis could only be obtained by comparing P, the before-tax capital input, with the unadjusted value of the lease premiums L' -- that is, before the Capital Allowances have been transferred.

A would-be borrower may approach a Bank in either of two guises : firstly, as a supplicant for overdraft facilities to

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1. A similar observation has been made by MOYER [103] in the U.S.A. concerning the Investment Tax Credit (ITC) which attaches to the purchase of an asset (currently this is valued at 7% of the capital value to be set-off against the tax liability after one year). The ITC may go to the Lessee or Lessor, but if the latter receives it MOYER correctly argues that there should be a corresponding reduction in the lease repayments.

purchase some asset[1], and secondly, as one who wishes to utilise the leasing facilities offered by (some other part of) the Bank. The Bank, in its two parts, will then offer financing terms. For the leasing contract these may well reflect some passing on of the Capital Allowances secured by the Bank on the asset. For the straightforward overdraft they will not, as the Bank will not receive such Allowances.

The 'passing-on' of the taxation advantage can alternatively be thought of as the opportunity cost of the Capital Allowance foregone by the Lessee. Thus :

$$\sum_{t=0}^{n} (L'_t - L_t)\beta \leqslant CA_t$$

This expression shows the reduction in the lease schedule which reflects the Capital Allowances; with β being the appropriate discounting (capitalising) function. The equation is not an equality because the Lessor will probably retain a proportion of the Allowance. After all, it is his taxation liability that is being employed to the benefit of both parties.

Thus, although a set of before-tax tables have been compiled it must be recalled by the Lessee that the cash-flow series

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1. Directly or indirectly, Banks still protest that it is not their function to provide capital for long term fixed assets, but as to how realistic this is today is very much open to question. If by borrowing working capital the client frees his own funds for fixed asset procurement is there realistically any difference?

employed is a hybrid consisting of part pre-tax and part post-tax figures. It follows, therefore, that a comparison between the cost of leasing and borrowing on a before-tax basis can lead to an erroneous conclusion because the lease figure has been distorted by the passing-on of the Capital Allowance.

8.4 THE AFTER TAX YIELD -- BORROWING AND LEASING

From the empirical study it was observed that by the 'cost of bank finance', businessmen would simply express the after-tax rate of interest as i(1-t); where i is the cost of funds employed and t is the prevailing tax rate. However, a more rigorous examination of the cash-flows associated with bank finance indicate this is by no means sufficient.

The neglected element missing from this analysis is the actual use of the bank finance -- that is, the investment of those funds into fixed assets. It is assumed that the bank finance is used directly, or by freeing corporate funds from working capital, in the outright purchase of an income-earning asset. This process can be conveniently termed the "borrow and invest by buying" decision. Thus, the complete cash-flow series can be specified as follows:

TABLE 8.1

BORROW AND INVEST BY BUYING

t= 0	1	2	3	.....	N	N+1
p						
	(i)	(i)	(i)	.....	(i)	
		ti	ti	.....	ti	ti
					(P)	
(A)						
		CA				

The above cash-flows, at yearly intervals, are simply the receipt of P and its immediate investment (A) in an asset, followed by a series of i's (the interest repayments), and the tax-relief on i, ti. At the end of the sequence a negative (P) is shown to represent the repayment of the borrowed principal. It will be noted that the combined effect of the capital receipt and investment, (P-A), is zero. The aggregate series would then look as follows:

t=o	1	2	3	N	N+1
o	(i)	(CA + i(t-1))	i(t-1)	((P)+i(t-1))	ti

Given that a solution rate exists for this series, what lease cash flow series is it to be compared with? Possible alternative cash-flow series are given in the following table 8.2 which starts with the basic receipt of the capital value of the asset and the lease premiums required to finance it. Initially, these are premiums unadjusted for Capital Allowances received by the Lessor. These assumptions are successively relaxed.

TABLE 8.2

LEASE FINANCING : ALTERNATIVE CASH-FLOW SPECIFICATIONS

LESSEE:	BORROW AND INVEST BY LEASING
1. P (L') (L') (L') ...	NON-QUALIFYING ASSET, PREMIUMS THEREFORE UNADJUSTED FOR CAPITAL ALLOWANCES AND UNRELIEVED FOR TAX.
2. P (L') (L') (L') ... tL' tL' tL' ...	NON-QUALIFYING ASSET, PREMIUMS THEREFORE UNADJUSTED FOR CAPITAL ALLOWANCES BUT TAX RELIEVED
3. P (L) (L) (L) ... (CA)	QUALIFYING ASSET, PREMIUMS THEREFORE ADJUSTED FOR CAPITAL ALLOWANCES BUT NOT TAX RELIEVED, AND WITH SPECIFIED OPORTUNITY COST OF CAPITAL ALLOWANCE FOREGONE.
3' P (L) (L) (L) ...	AS (3), EXCLUDING CAPITAL ALLOWANCE OPPORTUNITY COST.
4. P (L) (L) (L) ... (CA) tL tL tL ...	QUALIFYING ASSET, PREMIUMS ADJUSTED AND TAX RELIEVED, OPPORTUNITY COST SPECIFIED.
5. P (L) (L) (L) ... tL tL tL ...	AS (4), EXCLUDING CAPITAL ALLOWANCE OPPORTUNITY COST.

If, as in Table 8.1, the Capital Allowance is specified as a positive benefit to the "borrow and invest by buying" decision, it would patently be wrong also to bring it in as a negative outflow (opportunity cost) in the "borrow and invest by leasing" decision; for that would be double counting of the same cash-flow. This item cannot be shown as a positive realised benefit to the one decision and an opportunity cost of a benefit foregone on the other half of the same decision. This would seem to indicate that a correct "lease versus borrow" implicit

yield comparison ought to be between the yield on the "borrow and invest by buying" decision as derived from the data of Table 8.1 and alternative 5 in Table 8.2.

This is only part of the analysis however. It has been argued in this Thesis that the leasing decision is essentially a combined investment and financing decision. The "borrow and invest by buying" decision cash-flows of Table 8.1, and indeed the "borrow and invest by leasing" decision as so far specified in Table 8.2 have failed to recognise the integrated decision by not including the operating cash-flows associated with the asset.

t=	0	1	2	3	4	....
OPERATING CASH-FLOWS	-	f_1	f_2	f_3	....	
TAXATION THEREON	-		(tf_2)	(tf_2)	(tf_3)	....

To ensure strict comparability of the two decisions the above cash-flows should be added to both series. However, as the operating cash-flows are in this case identical for the alternatives, computational economy is secured by excluding them. Arguably, there should be included in the operating cash-flows, so far as concerns the "borrow and invest by buying" decision, the variable (A) of Table 8.1.

(A) represents the commitment of the borrowed funds to the asset and therefore is clearly part of the operating cash-flows : that is to say part of the investment decision cash-flow rather than the

financing decision cash-flows. The question has to be asked : is there any equivalent cash-flow in the leasing decision such that the same economy of computation can be achieved by ignoring this amount in both of the decisions?

At first sight this would not seem to be the case, there clearly is an amount (A) in the "borrow and invest by buying" decision. After all, the overdraft facility is made available to the client who then commits it to the purchase of an asset. In the leasing decision, however, the funds are supplied by the Lessor direct to the supplier of the fixed asset. The Lessee is not involved in the actual investment of the sum involved in the capital asset.

Further thought indicates that this non-identity is spurious. In the "borrow and invest by buying" decision admittedly it is the client who makes out the cheque or other remittance for onward transmission to the asset supplier; whereas, in the leasing decision it is the Lessor who makes out the remittance. Yet, in the first case the client is arguably acting in the role of agent, especially in so far as the borrowing will have been made on the explicit condition that the funds thus raised are committed to the asset and to no other. So far as concerns the leasing decision, the direct transmission of the funding remittance from the Lessor to the capital supplier is no more than the physical implementation of a legal requirement that the equity in the asset shall be shown to remain clearly with the Lessor. Other than reasons of convenience, or possibly of trust, there appears to be no reason why the Lessor should not dispatch the necessary remittance to the Lessee who would then hand it over to the supplier of the asset.

The real involvement of the Lessee is clearly indicated by the requirement to be found in most leasing contracts that the Lessee shall at some time specify to the Lessor, firstly, that the asset has been received in good order and, secondly, that it is indeed the asset that is the subject of the leasing contract. Until this certification has been received by the Lessor from the Lessee, the Lessor will not make payment to the asset supplier. Clearly, in the leasing contract there is in reality the same receipt of the capital borrowed by the Lessee and its immediate investment by him in the asset as is more explicitly recognised in the "borrow and invest by buying" decision cash-flow analysis. On these grounds, therefore, it is clear that there is the same identity of (A) in either decision and that, in the interests of computational economy, this item can be excluded from both sides of the comparison.

With these considerations in mind the cash-flow analysis relating to the "borrow and invest by buying" decision can be amended as below:

TABLE 8.3

AMENDED BORROW AND INVEST BY BUYING DECISION

t = 0	1	2	3	...	N	N + 1
P						
	(i)	(i)	(i)	...	(i)	
		ti	ti	...	ti	ti
					(P)	
		CA				

The removal of the outlay (A) in Table 8.3, together with the elimination from both sides of the comparison of the asset's operating cash-flows is, as previously noted, in the interest of computational ease.

The realisation that the inclusion of the Capital Allowance as a specific benefit to the "borrow and invest by buying" decision and also as an opportunity cost to the "borrow and invest by leasing" decision would be double counting, means that the correct comparison between the two decisions is that arising from a solution of the cash-flows specified in Table 8.3 and alternative 5 of Table 8.2 respectively.

The Capital Allowance can be brought in as a benefit to the buying decision or as a cost to the leasing decision. The following section goes on to specify a matrix which indicates the relevant cash-flow parameters to compare.

8.5 EMPIRICAL OBSERVATION AND RECOMMENDATIONS

In practice the field research suggested that businessmen rarely, if ever, pursue the course of analysis suggested above, prefering in its place to use a form of algorithm i(1-t) when evaluating the "borrow and invest by buying" decision. It is uncommon for practitioners to incorporate into their analysis the capital movement -- particularly, they would frequently neglect the influence of the capital repayment at the end of the period. Furthermore, the field study indicated that businessmen rarely, if at all, include the Capital Allowance obtainable from the money they had borrowed and invested.

Thus, in an effort to accommodate the common practice of excluding the Capital Allowance from the borrowing decision (despite it being a realisable benefit thereof) an alternative set of Tables have been constructed which include the opportunity cost foregone in the leasing analysis : box 3 in Table 8.4 overleaf.

One important point must be stressed concerning Table 8.4 and observed industrial practice. It has been argued in this Chapter that the correct analytical comparison is between either box 1 and 2, or box 3 and 4. In practice, however, it has been perceived that businessmen often compare box 1 with box 4 thereby erroneously failing to take into consideration the effect of the resulting Capital Allowance on the decision cash-flows. Hence, the final recommendations may be summed up as follows (see Table 8.5) :

> When comparing the "borrow and invest by buying" decision with the "borrow and invest by leasing" decision, it is necessary to establish whether it is the policy of the Lessee to include or exclude the Capital Allowance from the "borrow and invest by buying" decision.
>
> Having settled this, the rules as set out in Table 8.5 should be applied.

TABLE 8.4

CASH-FLOW ALTERNATIVES : DECISION MATRIX

BORROW	LEASE
1 P (i) (i) ... (i) ti ti .. ti ti (P)	2 P (L) (L) (L) ... tL tL tL .. (CA)
3 P (i) (i) ... (i) ti ti .. ti ti (P) CA	4 P (L) (L) (L) ... tL tL tL ..

TABLE 8.5

DECISION CRITERIA

BORROW AND INVEST BY BUYING	VS	BORROW AND INVEST BY LEASING	INSTALMENT DEBT TABLES TO BE USED FOR LEASING DECISION
EXCLUDE CAPITAL ALLOWANCE (BOX 1,TABLE 8.4)		INCLUDE CAPITAL ALLOWANCES (BOX 2,TABLE 8.4)	TABLES 9 - 12
INCLUDE CAPITAL ALLOWANCE (BOX 3,TABLE 8.4)		EXCLUDE CAPITAL ALLOWANCES (BOX 4,TABLE 8.4)	TABLES 5 - 8

8.6 USING THE INSTALMENT DEBT TABLES

I. THE BEFORE TAX YIELD : TABLES 1 TO 4

Using the initial expression for Instalment Debt contracts the following elementary transformation may be made to obtain the NPV FACTOR which is applicable to a lease contract $L_o, L_1, L_2 \ldots L_N$ = a constant repayment per discounting period. Thus:

$$\text{NPV FACTOR} \quad \frac{P}{L} = \sum_{t=o}^{N} \frac{1}{\left(1 + \frac{i}{M}\right)^{M.t}}$$

This summation is the Uniform Series Present Worth factor of a cash-flow sequence with periodic repayments. However, it is not the easiest of numbers to calculate using ordinary yearly period tables so the expression may be rearranged[1] to assist computation as follows:

$$\text{NPV FACTOR} \quad \frac{P}{L} = \frac{\left(1 + \frac{i}{M}\right)^{M.N-1} - 1}{\left(\frac{i}{M}\right)\left(1 + \frac{i}{M}\right)^{M.N-1}} + 1$$

---

1. This expression has been modified from that shown in RENWICK [115, pp95/96]so as to take account of the initial t=o lease payment. For individual calculations the expressions in brackets are generally available from standard sets of discount tables. It should also be noted, in advance of subsequent 'after-tax' equations where the specification of the cash-flow series is significant, that the expression to the right hand side of the equality is positive -- in cash-flow terms L is a negative number (and will appear as such in later after-tax equations). Here, however, it does not affect the value of the NPV FACTOR and is shown in this fashion simply to give positive numbers in the Tables.

It will be observed from this equation that relatively small numbers will be raised to quite high powers -- for example, a 12 year, monthly repayment contract bearing a 5% yield ($i = 0.05$, $M = 12$, $N = 12$) would be 1.00416 to the power of 144. Clearly, great care must be taken in calculating this number.[1]

Thus, the before-tax rate can be established in the following, extremely convenient manner :

1. For each lease contract compute (P ÷ L) to obtain the NPV FACTOR : this will be used in all the Tables .
2. Seek the appropriate before-tax tables (Tables 1 to 4) corresponding to the number of payments to be made per annum : M = 12, 4, 2 or 1 ... monthly, quarterly, half-yearly or yearly.
3. Look along the row corresponding to the length of the contract N = 1 to 12 years (alternatively NN = number of rentals in the schedule). Find the nearest number to the (P ÷ L), NPV FACTOR. This will be situated in the appropriate implicit interest rate column.

---

1. It is frequently found that calculators and other accounting machines will round figures up or down, to a small but significant extent, when low numbers are raised to large powers. This can alter the effective interest rate on a long life contract. A more appropriate alternative in such cases is to computerise the formula or to use six figure logarithms. An inspection of the Tables will reveal the necessity for great accuracy -- full interest rate points being separated by slim margins in the NPV FACTOR.

EXAMPLE 1

Consider a 5 year contract for an asset costing £100,000 with monthly repayments of £2300. First establish the NPV FACTOR : £100,000 ÷ 2300 = 43.48. Turn to Table 1 (see Appendix No. 1), the before-tax monthly repayment schedule, and look along the 5 year, 60 repayments, row until there is found the nearest number to 43.48. This is in the 14% interest rate column.

II. THE AFTER-TAX YIELD; EXCLUDING CAPITAL ALLOWANCES : TABLES 5 TO 8

Let:

CT = Corporation Tax Rate :

$USPWF_{i/t}$ = Uniform Series Present Worth Factor, i% for t years

$SPPWF_{i/t}$ = Single Payment Present Worth Factor, i% for t years

Thus, the tax relief = $M.L.CT.(USPWF_{i/t+1} - SPPWF_{i/1})$

The bracketed expression merely represents the discounted series from t=2 to N+1. This enables the tax relief to be determined from existing tables should the computation be undertaken by hand or outside the range of the interest rate tables shown in the Appendix. Hence, the following expression may be derived :

$$\text{NPV FACTOR } \underset{L}{P} = -\left[\frac{\left(1+\frac{i}{M}\right)^{MN-1} - 1}{\left(\frac{i}{M}\right)\left(1+\frac{i}{M}\right)^{MN-1}} + 1\right] + M.CT\left[\sum_{t=1}^{N} \frac{1}{(1+i)^{t+1}} - \frac{1}{(1+i)}\right]$$

The right hand side of the equation being the figure shown in the series of Tables 5 to 8. To establish the yield simply determine the NPV FACTOR and follow the procedure as indicated above.

EXAMPLE 2

Consider an 8 year contract for an asset costing £50,000 with quarterly repayments (M=4) of £3690. Firstly determine the NPV FACTOR : 50,000 ÷ 3690 = 13.54. Turn to Table 6, the after-tax, Capital Allowance excluded, quarterly repayment schedule and look along the 8 year line :

	6%	7%	8%	9%
7 years		⋮	⋮	
8 years		13.609	13.296	
9 years				

By interpolation the nominal interest rate is 7.6%

III THE AFTER TAX YIELD, INCLUDING CAPITAL ALLOWANCES : TABLES 8 TO 12

The appropriate equation is thus :

$$P = -\sum_{t=o}^{n} \frac{L_t}{(1+i)^{Mt}} + M.CT\left[\sum_{t=1}^{n} \frac{L_t}{(1+i)^{t+1}} - \frac{Lt}{(1+i)}\right] - P.CT.CA.\frac{1}{(1+i)^2}$$

This may be alternatively expressed as:

$$P\left(1 + \frac{CT.CA}{(1+i)^2}\right) = L_t \left\{ \text{PREVIOUS NPV FACTOR AFTER TAX} \right\}$$

$$\text{NPV FACTOR}\ \frac{P}{L} = \frac{\left\{ \text{PREVIOUS NPV FACTOR AFTER TAX} \right\}}{1 + CT.CA.\ SPPVF_{\,i/2}}$$

where CA = Capital Allowance Rate (= 100%)

EXAMPLE 3

Consider a 3 year contract for an asset costing £1000 with half-year repayments (M=2, MN=6) of £215.

THE NPV FACTOR : 1000 ÷ 215 = 4.65 which from Table 11 gives us an After-Tax yield of 20%.

It is recommended that when two lease contracts are being compared in a situation that precludes the use of a 'borrowing' alternative, then Tables 9 to 12 should be used because they contain the full opportunity cost cash-flow series. Note also that for Tables 4, 8 and 12, the yearly repayment schedules, lease contracts are shown which run for the number of years indicated in the left-hand column : viz a 3 'period' contract will have 4 repayments (the first being at t=o and the last at t=3) with the Lessee retaining the asset for a primary period which lasts up to the commencement of period t=4. To avoid the slight confusion this can cause, the user should, in this example, read along the 4 'year' line when trying to match the NPV FACTOR with the implicit interest rate.

8.7 THE MIXED FINANCING PROJECT

A potential hazard so far excluded from our discussion and analysis of financing projects is the existence of a 'non-simple' cash-flow series : where the sign of the aggregated periodic cash-flow sequence changes from positive to negative more than once (which is typically the case in an after-tax series). In such circumstances it is necessary to determine whether the project is 'mixed', and consequently whether the analyst is faced with problems of multiple solution rates, (more than one yield for the same cash-flow series), or the invalidity of the apparent solution rate.

If it can be shown that the project is indeed 'mixed' then the apparent yield (the sequence's IRR) is not applicable and must be replaced by what MAO[1] calls the RIC, 'r', the return on invested capital; which is a complex function of r and k, the company's weighted average cost of capital.

While the RIC technique is widely recognised as the correct analytical approach for solving 'mixed' investment projects, it has not been modified in the literature to interpret 'mixed' financing projects[2] (in our case we have a 'mixed' integrated investment and financing project). The difficulty presented in a 'mixed' investment project is that it will fluctuate from being an absorber of corporate funds to being a provider of corporate funds. When it is in the former state it must "earn" its return on capital, the RIC, when it is in the latter 'surplus' state it is granted an earning power on the funds it provides, equal to the cost of capital of the company, k. In certain situations the RIC yield can differ substantially from the apparent yield so that great care must be taken when establishing the internal interest rate.

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1. The reader is referred to MAO [93,p197 et.seq.] where an algorithmic technique, based on the RIC, is shown to analyse a mixed investment project. For a more detailed proof see TEICHROEW, ROBICHEK & MONTALBANO [128].

2. This problem has been raised by WIAR [146] in the very specialised context of multiple rates of return in a leveraged lease (where several type of finance, e.g. debt, mortgage financing and equity funds, may be used simultaneously to fund the lease, see [146,p1282]) WIAR notes the possibility of a 'mixed' project, but his analysis is conducted within the confines of USA leverage lease practice and tax laws : these conditions clearly do not apply in the U.K. and consequently WIAR's analysis if not pursued further here. However, what follows is a generalised analysis of the 'mixed' financing project problem as observed in a U.K. context.

8.8 THE YIELD ON BORROWED CAPITAL - YBC

As non-simple financing projects are frequently observed, is it possible merely to reverse the RIC analysis when considering a 'mixed' series on the grounds that the debt instrument moves from being a provider of funds to being an absorbed of funds? To analyse either variety of 'mixed' project it is necessary to establish the "project balances" of a cash-flow series : which are simply defined as the accumulated compound value of the cash-flow sequence. In the case of a financing project which is 'mixed' it will be necessary to compound the positive project balances, S_t, forward at the YBC, i'; which is the financial equivalent of the RIC in an investment project. However, when the project balances are negative the project requires an injection of funds (a reallocation of capital from other sources within the company) which will be assumed to cost 'b'; the compounding rate on negative balances.

Thus, using the following after-tax lease contract --- which includes the asset's Capital Allowances -- as an example of the YBC technique, we have :

TABLE 8.6

LEASE CONTRACT CASH-FLOW SERIES

t=	0	1	2	3	4	5	6
P	1000						
L	(279)	(279)	(279)	(279)	(279)		
tL			140	140	140	140	140
CA			(500)				
TOTAL	721	(279)	(640)	(139)	(139)	140	140

The apparent yield on this series is 20% (see Table 12 in the Appendix). However, as the series in 'non-simple' it is necessary to determine whether it is also a 'mixed' project (it could be a pure series, see Table 9.7, in which case it is safe to use the internal yield. This is accomplished by compounding the TOTAL cash-flow line forward at the minimum rate which will make all project balances positive[1]. In this example the minimum rate is 29%; at this level the project balances are :

t=	0	1	2	3	4	5	6
PROJECT BALANCES S_t	721	651	200	119	14	158	203

To test if the project is mixed an examination must be made of the sign of the terminal project balance, S_N, and apply the following criteria.

TABLE 8.7

MIXED PROJECT CRITERIA

NON SIMPLE FINANCING PROJECT				
PURE	:	$S_t \geqslant 0$	;	$S_N \leqslant 0$
MIXED	:	$S_t \geqslant 0$	:	$S_N > 0$

Thus, this financing project is mixed and the Yield on Borrowed Capital appraisal technique must be adopted.

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1. The reader unfamiliar with the technique and proof of this concept is referred to MAO [93, p203]. The method to be described above is the reverse of the RIC analysis where the project balances should be negative -- this occurs because of the large negative outlay of the asset at t=o. In the YBC analysis the Lessee receives a positive inflow of (P-L) at t=o, therefore the project balances are positive.

By trial and error it is necessary to establish the YBC,i', which in combination with a given rate for 'b' will reduce the terminal project balance to zero. If a rate for 'b' of 14% is assumed, i', the correct yield, can be established as follows:

TABLE 8.8

YIELD ON BORROWED CAPITAL : MIXED SERIES

$S_0 = 721$		
$S_1 = 721(1 + 0.18) - 279 = 572$	$S_t \geq 0$	$i' = 0.18$
$S_2 = 572(1 + 0.18) - 640 = 35$	$S_t \geq 0$	$i' = 0.18$
$S_3 = 35(1 + 0.18) - 139 = -98$	$S_t \geq 0$	$i' = 0.18$
$S_4 = -98(1 + 0.14) - 139 = -250$	$S_t < 0$	$b = 0.14$
$S_5 = -250(1+ 0.14) + 140 = -123$	$S_t < 0$	$b = 0.14$
$S_6 = -123(1+ 0.14) + 140 = 0$	$S_t = 0$	YBC found

Hence, given a 'b' of 0.14 it has been demonstrated that the 'true' yield on borrowed capital is 18% -- somewhat lower than the 'apparent' yield of 20%. Fortunately this yield is unique, but this may not hold for other types of financial instrument. (The structure of a lease schedule's after-tax cash-flow may well preclude the possibility of multiple yield contracts. Other forms of borrowing, such as conditional sales agreements and other financial contracts with complex fluctuations in their cash-flow profile, may give rise to multiple yield solutions which are very difficult to interpret meaningfully).

How is the correct rate for 'b' established? In the case of a financing project whose project balances are positive (the lease is 'lending' to the company) it has been stated that the project balances should be compounded forward at the YBC. However, when the project balances are negative (the lease is effectively 'borrowing', or requiring support, from the company) then the compounding rate is not the YBC but the prevailing Investment Opportunity Rate of the organisation.

In a position of equilibrium -- the corporate lending rate equals the corporate borrowing rate -- this would be the organisation's cost of capital. But the existence and utilisation of leasing as part of a Planned Financing Mix[1] implies that the firm is using this source of funds to alleviate a tight capital rationing situation. Thus, it is conceivable that a 'slack' rationing situation still pertains (the company is experiencing a modest capital rationing problem). Under these circumstances the Investment Opportunity Rate becomes the IRR of the marginally rejected project.

The analytical procedure is then immediately confronted with a succession of highly complex interdependencies between the I. & F. decisions. Such interactivities make it exceedingly difficult to establish the company's marginal efficiency of capital -- which is the parameter to employ as the appropriate 'b' value. These problems have been discussed elsewhere in the Thesis (notably Chapters 4 and 5) and, in the context of the

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1. For a definition see section 7.2, Chapter 7; or FAWTHROP & TERRY [48 and 49]

current debate, it must be conceded that for practical purposes it is to be assumed that the Investment Opportunity Rate is sufficiently close to the cost of capital that the latter may be safely used as a surrogate.

However, by very virtue of the fact that leasing is being used by the company it follows that the cost of capital will change, leading to an almost intractable problem unless advanced iterative techniques are resorted to (such as mathematical programming).

In an effort to obtain a workable solution, other then by computer, it could be assumed that when the firm is leasing and the project is mixed, then the compounding rate on negative project balances should be set at the 'pre-financing' cost of capital. This would imply that the algorithmic solution as shown in Table 8.8 would be lagging one period behind the actual change in capital structure.

It must be accepted, however, that the whole topic area of mixed financing projects is a fairly esoteric one (especially in practice) and a branch of financial management that will continue to elude a totally accurate solution. As such, it must be assumed, however reluctantly, that for practical purposes the solution rate to any "borrow and investment" sequence is acceptable and is in fact valid. Although, as a final caveat, if a company is embarking on a very large leasing contract which exhibits a non-simple cash-flow series, it would be prudent for the analyst to apply the Yield on Borrowed Capital technique in order to establish if the project is mixed and if so, how sensitive the apparent yield is.

8.9 CONCLUSION

The purpose of this Chapter has been fourfold:

1. To provide the financial executive with a set of Tables that may be used to evaluate the Nominal interest rate of a lease contract. With a small additional calculation the Nominal rate can be converted into the Implicit rate. It was clear from the Industrial Survey that many businessmen found this an irksome task given that no simple and efficient Tables exist in practice.
2. The field research also indicated that the 'lease vs. borrow' implicit interest rate comparison was very often incorrectly specified. This Chapter has attempted to provide a rational framework for such an analysis.
3. Arguably, the most serious omission in practice was the influence of the asset's Capital Allowance on the decision outcome. Thus, an attempt was made to enumerate and explicitly evaluate the potential impact of the Capital Allowances on both sides of the 'lease or borrow' comparison. The correct comparitors being displayed in Tables 8.4 and 8.5. The Appendix contains Nominal interest rate tables for both sets of alternatives depending upon whether the Lessee includes or excludes the Capital Allowance from the 'borrow' decision cash-flow.
4. A significant problem which can occur in this form of analysis is the unsuspected (at least in practice) presence of a 'mixed' financing project. An analytical procedure was developed to calculate the correct, adjusted, Yield on Borrowed Capital for

a mixed project. The many interdependencies that exist between the I. & F. decision and the marginal efficiency of capital make it difficult for a totally accurate solution to be derived from this procedure. In consequence it was argued that the derived Tables and the yields they indicate, are a sufficiently accurate proxy for the true YBC yield. However, if the lease project is of sufficient magnitude and a non-simple cash-flow series is revealed, then a YBC analysis should be conducted.

CHAPTER 9

THE EVALUATION OF AN INTEGRATED INVESTMENT AND LEASE FINANCING DECISION

9.I INTRODUCTION

The classic 'lease or borrow' decision is, with one or two exceptions, concerned purely with the financial alternatives available to the company : it does not acknowledge the fundamental and concurrent inter-relationship with the associated investment decision. This Chapter intends to redress this ommission in the literature by discussing a new method of appraisal : namely, the analysis of an integrated leased-linked-investment decision. The major departure from received thinking in this area concerns the incorporation into the evaluation of the concept of RESIDUAL CAPITAL BALANCES.

The relevance of residual capital balances (RCB's) to the leasing analysis will be explained and enumerated in the following discussion. It will be argued that RCB's are a major decision variable which management must consider when making the choice between leasing and competing forms of debt.

In Chapter 7 of the Thesis two principal leasing strategies were formulated on the basis of extensive empirical observation of U.K. leasing policy. These were termed "Planned Financing Mix" and "Spill-Over" financing. It is subsequently argued that the capital budgeting techniques and procedures used by a company should be appropriately modified so as to reflect the true economic consequences of adopting a given policy. It follows from this that the analysis of a lease is situation dependent.

The "Planned Financing Mix" concept is most important to our discussion because it gives reality to the concept of

residual capital balances. It is contended that many lease evaluation procedures are erroneous because they overlook two vitally important issues : the integrative nature of the decision (that is, the bringing together of the investment and financing decisions); and the creation, under circumstances to be defined, of residual capital balances.

9.2 THE EVALUATION OF EQUIPMENT LEASING CONTRACTS

As noted in Chapters 6 and 8, the evaluation of a debt instrument such as a leasing contract frequently takes the form of a discounted cash-flow appraisal, usually by determining the implicit or internal interest rate inherent within the repayment instalments. A comparison of the internal interest rates, or DCF yields, of two competing debt plans usually will give rise to a decision based upon the lower of the two interest rates.

Suppose then, that an asset with a capital cost of £1000 can be financed by the following alternative lease contracts. Each contract requires four period payments, payable at the commencement of each period. For the sake of simplicity and compressed tabulation, it will be assumed that each period is of 12 months duration.

TABLE 9.I

COMPETING LEASE CONTRACTS

CONTRACT	PERIOD 0-I	PERIOD I-2	PERIOD 2-3	PERIOD 3-4
LEASE A	(£322)	(£322)	(£322)	(£322)
LEASE B	(£400)	(£350)	(£300)	(£170)

N.B. The amounts are shown in brackets to indicate that they are negative quantities or cash outflows.

It can be deduced that an interest rate of 20% will discount both leasing contract's cash-flow series into equivalence with the £1000 capital cost of the asset -- that is, the internal interest cost of each of these contracts is 20%. It would therefore appear that on the above calculation the financial manager should be indifferent between these two means of financing the acquisition of the asset.

This analysis correctly brings into account the size and timing of the repayment schedules. It fails to consider, however, the effect of the RESIDUAL CAPITAL BALANCES specific to each scheme, defined as :-

'The residual amount of capital <u>outstanding</u> after the successive, cumulative repayments have been made'.

To observe how residual balances influence the appraisal of a lease, it is important to question the role of leasing in the capital budgeting mechanism. Leasing can influence the

number of projects to be undertaken if the finance budget is fixed, although patently it cannot effect the amount of funds available for allocation. Leasing enables a redistribution of the "pool" of funds to take place.

For example, if the asset in the above example were to be financed with internally generated funds it would cost £1,000 in a lump sum cash outflow. If it were to be leased under contract A, the first year cash outflow would only be £322 (the initial instalment payable at the beginning of the first period). If the amount of finance available to the firm was limited to £1,000, then to procure the asset by outright purchase would totally exhaust the capital budget. By leasing the asset, the company is able to acquire the asset plus additional assets, whose outright purchase cost is £678, or whose initial leasing instalments amount to £678.

These additional assets would not be available except through the use of leasing as a means of financing the first asset. This sum of £678 can be termed the "residual capital balance in year 0-I". The use of leasing to finance the first investment project has created a second investment project opportunity.[1]

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1. The assumption made here, and defended later, is that this investment is in the working capital of the organisation. This argument, if accepted, provides still further support for the concept of integrating the I. & F. decision. The residual capital balances are being incorporated into the analysis of the leasing decision and ipso facto, therefore, there is an integration of the financing decision and the secondary investment decision.

It is argued, therefore, that it is correct to credit the original lease financing decision and investment project with the return from the residual balances project. After all, they are a product of the same financing decision -- to lease rather than to acquire outright.

Earlier in the Thesis two circumstances were distinguished under which leasing might be used. An examination of these will hopefully clarify the issue of residual capital balances. (The reader may care to review the definitions given in section 7.2 II, Chapter 7).

A. If the leasing decision corresponds to a "Spill-Over" financing decision then, IN THESE CIRCUMSTANCES IT WOULD BE LOGICALLY CONSISTENT TO SAY THAT THE RESIDUAL CAPITAL BALANCES ARGUMENT IS NOT VALID. BY THE DEFINITION OF "SPILL-OVER" FINANCE THERE ARE NO EXISTING FUNDS WHICH CAN IN PART BE FREED TO FINANCE OTHER INVESTMENTS[1]

B. However, if it is decided that leasing shall be used as part of the company's PLANNED FINANCING MIX strategy -- thereby contributing to the stipulated relexation of

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1. The definition of "spill-over" financing can be identified more specifically as relating to the 'minimum amount of finance sought by the organisation to effect the investment project'. From the industrial research it appears that this is a reasonable assumption. Thus, the "spill-over" financing may be a lump-sum amount obtained from another debt sources but specifically used to purchase the asset in question, or it may be lease financing. Which ever it is (and the field study suggests it to be the latter) it is clearly meant to be the minimum amount of borrowing -- there is no question of a spill-over lump sum borrowing being used to finance a series of lease contracts. This would, in effect, constitute a second capital budgeting exercise.

capital shortage conditions such that there are funds which will be released by the use of leasing rather than outright purchase -- then the residual capital balances argument will apply. Under these conditions the evaluation of a lease contract must in some way include the opportunity for additional earnings which are generated by the residual capital balances.

The balance of this Chapter will be concerned with developing an exposition of such a technique.

9.3 An Integrated Analysis

It is argued that the evaluation of a leasing contract properly requires that the investment and financing decisions be brought together in an integrated appraisal; and that the evaluation procedure should include the following components:

I. The investment project's operating cash-flows.
2. The cash-flows generated by the financing instrument under consideration -- e.g. the series of leasing instalments.
3. The taxation cash-flow appropriate to the type of financing under consideration.
4. The exclusion or "washing out" of the interest component inherent in the financing instrument cash-flow series.
5. The determination of the residual capital balances, and the attribution of the potential earnings of those balances to the integrated decision.

This possibly rather complex-looking package is in fact much easier to implement than it at first appears. Before proceeding with the argument it is appropriate to comment briefly on items 4 and 5.

I. DISCRIMINATORY FINANCING

When discussing interdependencies in capital budgeting during Chapter 4, it was noted that the particular method of financing, used in respect of a given investment decision, will determine the type and size of Capital Allowances and other taxation cash-flows which will enure to that investment decision, so vitally effecting the outcome of its appraisal. This interactivity carries with it, apparently, the significant risk that an investment decision may be found to be acceptable purely because of an advantage which it enjoys in its financing. It is a cardinal tenet of financial theory that capital expenditure appraisal should not allow this.[1]

For, in the end, the cost which an organisation has to pay for one form of capital is, to a significant extent, conditioned by the use to which the organisation is making or proposing to make of other forms of capital.

It would follow, therefore, that the preferential financing which might be brought into an integrated investment and financing decision in respect of a particular proposed capital expenditure, would only be preferential because the suppliers of that particular finance were impressed by the remainder of the capital structure of the organisation. To give the proposal under review the benefit of that preferential finance would be, in effect, to grant a subsidy

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1. See for example MAO [93] SOLOMON [150] VAN HORNE [138]

to that proposal from all other proposals. This is termed "discriminatory financing". The favourable discrimination takes the form of a favourable interest rate.[1]

To minimise this discrimination in an integrated investment and financing decision, it is argued that the interest cost component of a leasing contract (or similar debt instrument) must be excluded from the financing cash-flows.

After all, that favourable interest cost is part of the company's weighted average cost of capital, the DCF criterion rate, which will already be subsumed in the discount rate to be applied to the decision.

It may subsequently be noted that in any lease schedule the size of the capital element of a particular payment is a direct function of the interest charged : which in turn has a corresponding impact upon the residual capital balances. In the appraisal technique shortly to be outlined the capital content of each instalment is involved, so it could be argued that this proposal is also guilty of discriminatory financing! It is more precise to note that residual capital balances are a positive function of the amount of borrowing implicit in the lease over its life. In respect of a given asset value, different leasing repayment schedules over a common life will generally imply different amounts of borrowed capital at different points in time in the common life. The method proposed recognises the different earning power generated by those different capitals, the existence

1. A typical lease appraisal example of this being that suggested by SCHALL [120

of which is not related to the overall financing pattern of the organisation and so may be correctly ascribed to the individual decision.

II. THE INVESTMENT OF RESIDUAL CAPITAL BALANCES IN WORKING CAPITAL

Various assumptions may be made concerning the location of the residual capital balances and their earnings. As a methodological convention the RCB's are assumed to be invested for one year in the working capital of the organisation, where they will be periodically reduced to finance the next repayment in the instalment series. The actual location of this investment may be in either:

(i) the working capital component of new projects; or,

(ii) it may be an investment in the working capital support of on-going operations.

Either location would free otherwise-committed capital from investment in unspecified capital formation and enable it to earn at the general or average rate thereon. The one-period investment into working capital can only be credited with the average return on assets enjoyed by the firm (later designated by the symbol 'b') for there is no way of knowing the precise location or usage of this working capital and as a result only an average rate can be used.

Although it could be argued by management that they had specifically leased asset X (rather than acquiring it outright) so that they could purchase Y -- with the return Y produces

being the embodyment of the return ascribed to the RCB's -- this is a discriminatory process. To avoid this bias, using the "pool" vs. "pool" argument, it is contended that the secondary investment opportunity, made available through leasing, be located in the 'neutral' area of working capital. The earnings from residual capital balances invested in working capital will of course also remain in working capital. Thus a chain of earnings will develop in a compound manner up to the end of the period covered by the integrated decision analysis when, in common with the convention adopted by most analysts working in the field of project appraisal,[1] they are assumed to be disinvested from the combined project.

In the examples which follow the choice of a pre-tax average earnings rate for 'b', rather than an after-tax rate, offers purely computational advantages : facilitating the correct timing of the subsequent tax cash-flows for discounting purposes.

Considerable debate is present in the literature on the method of establishing the true cost of working capital.[2] However, it is argued here that the return experienced by a company on its working capital component is an 'average opportunity cost' of the expected return from all the accepted projects (which by inference makes 'b' higher

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1. See AMEY & EGGINTON [2, p147]
2. See the book of reading by SMITH [151] ; or LAWSON [84]

than the weighted average cost of capital). As noted previously, the location of RCB's may be in on-going or new projects. Thus management may either : (i) establish the average anticipated return from all project sets to be undertaken between now and the horizon; or (ii) analyse the historic return on working capital for say the past two or three years. Hopefully, these figures will not be too dissimilar; but if there is a notable divergence than a preference may well be given to the forecasted returns available to the company.

III. THE POTENTIAL ERROR OF DOUBLE COUNTING

It might be argued that the specific introduction of earnings on the residual capital balances will lead to a form of double counting of income.

It has been proposed that the appraisal of an integrated leasing decision should bring into account a portion of the future earnings which are expected to accrue from the series of investments currently about to be undertaken; and by extension, a portion of the future earnings from all projects subsequently accepted throughout the planning period. Therefore, when the individual projects which 'provided' those earnings are/were appraised, arguably it would be wrong to impute to those projects any yield which was at a rate equal to, or lower than, the given value of 'b' -- on the grounds that this portion of the yield has been absorbed within the lease appraisal (the 'donor' investment could only justifiably claim the excess yield it generated above the rate 'b').

The proposed method of evaluation deliberately attempts to quantify the specific opportunity benefits derived (as a result of expanding to set of projects to be undertaken) through leasing.

Thus, the quintessential characteristic of the integrated RCB analysis lies in the explicit enumeration of the facility offered by each leasing contract to provide a totally unique secondary pecuniary advantage to the company. As such, each lease project will be attributed a distinctive pattern of RCB earnings effectively re-distributed from the set of newly created secondary investments.

This concept is not without its parallel, however, for in any discounting procedure one of the basic tenets of investment decision mathematics, namely the "reinvestment assumption" is equally subject to such a reproach.[1]

Thus, when the suggested RCB procedure is considered in conjunction with the other accepted projects in the finally accepted set of investments, it would be observed that the summation of earnings will exceed the 'correct' total by the

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1. For an explanation of the reinvestment assumption and its ramifications, see FAWTHROP [45, p191/194]: particularly the requirement that the "depreciation fraction" of cash-flow be re-invested in future projects at the equivalent yield if that yield is to be attained. Clearly, therefore, an intrinsic aspect of the discounting process relies upon the 'double counting' of project cash-flows.

quantity of earnings attributed to the residual capital balances. This is an implicit feature of such an opportunity cost model : but it is argued that it in no way invalidates the ultimate ordinal decision it produces.[1]

The lease or buy algorithm established in this Thesis is based upon a desire to derive a practical (non-programming) technique which is cognizant of the effects of a decision to lease upon the current capital budget, together with the repercussions such a decision produces on subsequent budgeting periods.

It could be argued that an investment and financing decision model of the linear programming type could cope adequately with such an aim. However, any such model will utilise a valuation technique which is intended to reflect the various premises built into the programme's structure. The question still remains -- what is the appropriate valuation technique for an equipment lease?

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1. Further, consider the examination of alternative decision procedures based upon linear programming, see CHAMBERS [30] The acceptance of a project will in part be dependent upon the dual value which that investment possesses. However those duals represent the marginal impact of that project upon a constraint and ultimately upon the objective function. The origin of the dual value lies within another project's contribution to the set NPV. It follows, therefore, that there is an implicit and inevitable double (or even multiple) counting inherent in such an appraisal. The same is true of the lease evaluation procedure developed here. It is essentially a sub-optimal decision criteria because, as previously discussed, there is an innate fallacy in appraising the individual project even though it is based upon an integrated I. & F. decision. (The nature of the ordinal solution will be considered again in section 9.6).

It will be recalled from Chapter 5 that the type of model proposed by CHAMBERS [30] would, on a prima facie basis, be ideally suited to the task. But, unfortunately, upon an examination of the valuation techniques adopted by this particular model it becomes clear that little progress can be achieved by using the programme as it is currently structured. As previously noted, the objective function consists of two elements (namely : the value of the post-horizon cash-flows of all projects accepted prior to the horizon; and the maximisation of the value of the corporate financial structure at the horizon). It follows that the contribution of leasing to the worth of the company will similarly have two components : firstly, the lease project's post-horizon operating cash-flows discounted back to the horizon at the weighted average cost of capital (which is pre-set and therefore excludes any leasing which is newly introduced); and secondly, the full lease repayment schedule still outstanding after the horizon discounted back to the horizon at the implicit interest cost of the lease arrangement (arguably a case of discriminatory financing). Both discount rates are somewhat dubious.

Clearly, as previously argued, such a method of evaluating a lease is inadequate. The current state of development of mathematical programming techniques fails to express the more global effects of accepting a lease, which can result in a failure to recognise the true potential of leasing within the overall corporate financing strategy. Further developments and refinements will have to be made before leasing can be

satisfactorily introduced into such models; and even then they will be faced with a recurrent problem of valuing the worth of a lease at the horizon.

9.4 THE APPRAISAL OF AN INTEGRATED LEASED-INVESTMENT PROJECT

Nomenclature:

Let A_t = Capital Allowances, attributable if the asset is purchased.

b = Before-tax average investment opportunity rate on the working capital of the accepted set of projects.

C_t = Incremental operating costs incurred by the project.

I_{lt} = Implicit Interest in lease repayments.

K = Weighted average cost of capital.

L_t = Lease repayments, per annum.

N = Life of lease contract; n = Life of asset

P = Cost of Asset if purchased

R_t = Incremental sales revenue generated by the project.

T = Corporation Tax rate.

t = Time interval in years

I. "PLANNED FINANCING MIX"

The algorithm may be specified as the summation of the following elements A to E. It is shown in this particular (simplified) form so that the reader may observe the precise pattern of cash-flows and tax conventions adopted. It is recognised that the algorithm could be specified in a more mathematically succinct manner but it is believed that the form adopted provides a more satisfactory explanation.

PRESENT VALUE (LEASE) =

$$\sum_{t=1}^{n} (R_t - C_t) \left[\frac{1}{(1+K)^t} - \frac{1}{(1+K)^{t+1}} \right] \quad : A$$

$$+ \sum_{t=o}^{N} (L_t - I_{1t}) \left[\frac{1}{(1+K)^t} - \frac{T}{(1+K)^{t+2}} \right] \quad : B$$

$$+ \sum_{t=o}^{N} \left[p - \sum_{s=o}^{t} L_s \right] \left[- \frac{1}{(1+K)^t} + \frac{1}{(1+K)^{t+1}} \right] \quad : C$$

$$+ \sum_{t=o}^{N} \left[P - \sum_{s=o}^{t} L_s \right] \left[S_{n-t+1} \right] \left[\frac{1}{(1+K)^n} \right] \quad : D$$

$$+ \sum_{t=o}^{N} \left[P - \sum_{s=o}^{t} L_s \right] \left[S_{n-t} \right] \left[\frac{b.T}{(1+K)^{n+1}} \right] \quad : E$$

Where the function 'S_t' is given by the recurrence relationships[1]

$$S_{t+1} = S_t(1 + b) - b.T. S_{t-1}$$

subject to the initial conditions : $S_o = 1$ and $S_1 = b$; for $t = 1, 2, \ldots N$

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1. The expansion of the recurrence relationship proceeds as follows: $S_o=1$: $S_1=b$: for $t=1$, $S_2=b(1+b)-b.T1$ (this gives column year 2 in Table 9.6 following); for $t=2$, $S_3=[b(1+b)-bT](1+b) - bT(b)$ (this gives column year 3 in Table 9.6), etc. up to $t=N$. It should be noted that the recurrence relationship holds true for $n \geq N$. This merely reflects the general practice in financial leasing where it is most unlikely that a lease repayment schedule will extend beyond the life of the asset.

The following notes amplify the precise meaning of each section of the algorithm:

Equation A : The investment, or operating, cash-flow series, discounted and taxed one year in arrears (the one year tax delay convention is common to all equations).

Equation B : The repayment of capital implicit within each lease charge; it will be noted that the interest element subsumed within the repayment schedule has been removed. As previously argued, this 'contamination' of the cash-flow stream must be eliminated because the cost of capital hurdle rate inherently takes this into consideration. To include this amount of interest a second time would clearly be double counting of the same cash-flow and tantamount to discriminatory financing. This expression is then discounted and receives tax relief.

Equation C : The residual capital balance investment and disinvestment in the working capital of the organisation, discounted at the appropriate year.

Equation D : This expression calculates the earnings on the residual balances and sums the resulting values at the horizon ($t = n$; see in particular the notes to Table 9.6 following). This earnings figure is then discounted.

Equation E : As a result of the one year tax delay convention the earnings on the residual balances generated in the year prior to the horizon will require taxing

in year n + I. This expression calculates the required tax figure and then discounts it.

II 'ONE YEAR' OR 'HORIZON COMPOUNDING' OF THE EARNING ON THE R.C.B's

The concept of residual capital balances credits the leasing option with the opportunity gain which it makes available to the company. However, the exact manner in which these earnings accrue can be modified depending upon circumstances and managerial direction. For example, close study of the "planned financing mix" algorithm and example, will reveal that a specific assumption has been made about how the earnings on the residual capital balances actually accrue. As is made clear in Table 9.6 the earnings schedule has accumulated on a compound basis up to the termination of the integrated project at the horizon. This assumption is made on the belief that management will allow the residual balances to remain within the company's pool of working capital. Alternatively, this initial assumption could be modified if an alternative policy were to be applied which permitted the earning to be disinvested from the project at the end of the year to which they relate, (see Table 9.10 following). This strategy, and the cash-flow it produces, could be argued to be a source of dividend payments or more probably a pre-assigned source of funds for further promotion of leasing contracts. Resolution of which option to adopt (either the 'horizon' or 'one-year' compounding earnings method) will depend upon either : managements insistence on a particular policy; or an evaluation of the NPV of the integrated project under both assumptions. Primarily the latter course is a precautionary measure : experience indicates

that the appropriate strategy is not always deducible prior to the application of the two algorithms. The reason as to why it is not so obvious lies in the varying impact made by different lease repayment schedules on the size and rate of decrease of the positive residual capital balances which, in turn, will directly influence the size and number of negative balances occuring at the end of the lease contract. This, together with the commensurate variation in the capital elements in each lease alternative, proves too complex a series of numerical interactions to be dealt with by anything other than a full calculation. Thus, the identity of the key variables involved in the evaluation (if any are dominant) and the selection of the appropriate strategy, introduce yet another dimension into the leasing problem.

III "PLANNED FINANCING MIX" --- ONE YEAR DISINVESTMENT MODEL

If the 'one-year' earnings assumption model is used then the residual balance equation as shown above is slightly modified : expression C, D, and E are eliminated and replaced by F.

$$\sum_{t=1}^{N} \left[P - \sum_{s=0}^{t} L_s \right] \left[\frac{-1}{(1+K)^t} + \frac{(1+b)}{(1+K)^{t+1}} + \frac{b.T}{(1+K)^{t+2}} \right] : F$$

This assumption simplifies considerably the earnings on the residual capital balances. The numerical expansion of this equation is to be found in Table 9.10 infra.

IV WHAT SHOULD THE LEASE ALTERNATIVE BE COMPARED WITH?

In Chapter 8 argument was advanced concerning the comparison between the implicit interest rate in a leasing contract and a "borrow and invest by buying" alternative. It was clear from the field-work that companies frequently considered their overdraft facility to be a "natural comparator" with any leasing arrangement.

However, there was sufficient deviation from this 'consensus' for the observer to conclude that management was, in fact, quite prepared to compare leasing with whatever alternative was available or most readily accessible. Various courses of action were described throughout the interviews to suggest a catholicity of lease versus (?) options :

I. Divisional management would perhaps conclude that in their circumstances it was a straightforward choice between outright purchase of the asset, using the head-office capital allocation, or leasing : no borrowing alternative existed and they were not empowered to seek external funds other than a pre-arranged local overdraft requirement.

2. For the centrally located finance director it may have been a question of leasing versus whatever form of debt could be raised at that time. The choice being constrained somewhat by the size of the contract and the current outstanding position with the group of potential funding sources.

3. For other companies leasing was employed as a matter of course, even necessity, in view of their taxation position; in which case it was then a matter of establishing which was the most favourable leasing plan.

4. In periods of financial urgency, such as the "spill-over" leasing strategy previously defined, there was no immediately available alternative at all. Here too it was a question of choosing the best lease contract.

The important conclusion to be drawn from this industrial experience is that external analysts cannot make a dogmatic statement about what the correct alternative is : lease vs own funds; lease vs overdraft; lease vs term loan; or lease vs lease : because it can be any of these, depending upon the circumstances that face the company at the moment the decision is taken. Management is constrained by the investment and financing decisions it has made, it is making and it intends to make. The non-uniformity of decision variables reflects business-life and the researcher, and the analytical tools he proposes, must accommodate this fact.

For the purposes of illustration in this Thesis, it will be assumed that the decision rests on a 'lease or buy with own funds' comparison. However, a 'lease versus lease' comparison can be achieved by applying the alternative lease contracts to the leasing section of the 'lease vs buy' decision. It must also be noted that should the comparison be between leasing and a term loan which was payable in instalments, comprising of capital plus interest as

per a lease, then it is clear that the residual capital balance argument will apply to both alternatives. <u>There is nothing unique to lease financing which gives it a pre-emptive right to the opportunity gains available from the earnings on the RCB's</u>. It is the prevailing circumstances that decide whether RCB's exist to be ascribed to a project.

There is, however, one important reason why the 'lease or buy' decision has been selected as a numerical example and this rests on the necessity to conduct the analysis within a strictly comparable framework. One principal difference between leasing and buying an asset is that the latter action carries with it a Capital Allowance (which under current U.K. legislation amounts to a 100% first year allowance). As with the residual capital balances argument, the receipt of the Capital Allowance does in fact provide the opportunity for a secondary investment. To ensure comparability, the evaluation of the 'buy' decision must also explicitly include the opportunity benefit made available through the secondary investment of the Capital Allowance. Thus, the relevant algorithm for the 'buy' with own funds comparison, including the re-investment of the Allowance upto the horizon can be expressed as follows:

$$NPV(PURCHASE) = -p + \sum_{t=o}^{N} (R_t - C_t)\left[\frac{1}{(1+K)^t} - \frac{1}{(1+K)^{t+1}}\right] + A_t{}^T\left[S_{n-2}\right]$$

Where 'S_t' is the recurrence relationship previously described but with alternative initial conditions, $S_o=0$ and $S_I=I$ for t = I,2... N. (For a numerical illustration see Table 9.12).

9.5 A NUMERICAL EXAMPLE OF THE RESIDUAL CAPITAL BALANCES CONCEPT

I. THE LEASE VS. BUY DECISION UNDER "PLANNED FINANCING MIX" CONDITIONS

The problem confronting management is whether to lease, purchase or reject a particular investment opportunity. As previously argued, this is contrary to much of the received opinion which in general specifies that a sequential analysis be performed : first the investment decision, if favourable then and only then conduct the 'lease or buy', or 'lease or borrow' decision. Argument has been advanced in this Thesis for an integrated decision.

In practice, the treasury function of an organisation will present management with a variety of potential lease contracts, each offering an individual cash-flow repayment profile and most probably competing interest rates. As such, it is incumbent upon the analyst to nominate the most advantageous instalment debt plan. The algorithms shown provide a powerful technique for screening competing lease contracts.

If the corporate financial circumstances dictate it, the most beneficial lease option should then be compared with the NPV of the project when financed with internal funds (or, if appropriate, with borrowed funds used specifically to finance the asset in question). In the following example internal funds are employed in the outright purchase-acquisition of the asset. This provides an opportunity to illustrate the 'earning on the Capital Allowances' technique previously described.

Consider the following problem:

An asset may be purchased outright for £10,000, or be made the subject of a lease contract with 5 yearly instalments of £2593 starting at t=o. At the end of the 5 year primary period the salvage value of the asset is assumed to be zero and (for the sake of simplicity) it will be assumed that the operating costs of the asset are exactly the same, irrespective of whether the asset is purchased or leased. The company adopts a "planned financing mix" strategy.

Hence, examining the leasing contract it can be established that the effective before-tax interest rate[1] is 15%. As a first step in the analysis it is necessary to determine the division between capital and interest portions of each lease repayment.

TABLE 9.2

LEASE REPAYMENT SCHEDULE

TIME t.	0	I	2	3	4	5
VALUE OF ASSET	10,000					
LEASE REPAYMENTS	(2593)	(2593)	(2593)	(2593)	(2593)	-

From this specification of the lease contract is is possible to establish its Capital Recovery Table :-

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1. This can be determined by Table No. 4 in the Appendix; NPV FACTOR = 10000 ÷ 2593 = 3.856, which is to be found at the co-ordinates '5 years', '15% interest rate'.

TABLE 9.3

CAPITAL RECOVERY TABLE --- CALCULATION OF IMPLICIT INTEREST

TIME t	CAPITAL OUTSTANDING AT START	INTEREST @ 15%	CAPITAL + INTEREST	LEASE REPAYMENTS	CAPITAL OUTSTANDING AT END
0	10,000	-	10,000	2593	7407
I	7407	1111	8518	2593	5925
2	5925	889	6414	2593	4221
3	4221	633	4854	2593	2261
4	2261	339	2600	2593	-

With the interest costs implicit in each repayment clearly established they can now be 'washed-out' of the lease schedule; as per expression B in the planned financing mix algorithm; to leave the capital payments per period.

TABLE 9.4

CAPITAL ELEMENT OF LEASE INSTALMENTS

TIME t	0	I	2	3	4	5
L_t	(2593)	(2593)	(2593)	(2593)	(2593)	-
I_{1t}	0	1111	889	633	339	-
$L_t - I_{1t}$	(2593)	(1482)	(1704)	(1960)	(2254)	-

The residual capital balances, as previously defined, are the capital amounts outstanding after each lease repayment has been made. Hence, as the total sum of the lease repayments will always exceed the cost of the asset if there is a positive interest rate, so the residual capital balances will automatically change from positive to negative as the accumulating repayments exceed the cost of the asset. The value of the residual capital balances in each of the years of the lease is calculated as follows:

TABLE 9.5

COMPUTATION OF RESIDUAL CAPITAL BALANCES

TIME t	0	1	2	3	4	5
LEASE REPAYMENTS	(2593)	(2593)	(2593)	(2593)	(2593)	-
Σ REPAYMENTS	(2593)	(5186)	(7779)	(10372)	(12965)	-
RESIDUAL CAPITAL BALANCES [P - Σ L.R.]	7407	4814	2221	(372)	(2965)	-

In Table 9.6, the 'horizon compounding' assumption relating to the earnings on the residual capital balances is fully enumerated. The data shows the gross earnings and the taxation thereon as it accrues through the reinvestment process. At the end of each year the earnings and taxation from the RCB's are aggregated and the net figure promptly reinvested back

into working capital. This rather laborious exposition is adopted to clearly demonstrate the assumptions implicit in the model, which may be listed as :

ASSUMPTIONS TABLE 9.6 AND TABLE 9.12

1. The average earning rate 'b' applicable to the residual balances (and in Table 9.12 to the Capital Allowance) is 30% before-tax --- 15% after-tax, which is marginally higher than the after-tax cost of capital of 12%. It must be stressed that these figures are purely for illustrative purposes.
2. The earnings compound forward at 'b', the anticipated return on the company's working capital.
3. Residual Capital Balances (and the Capital Allowance of Table 9.12) are invested in working capital for one year periods.
4. No taxation relates to working capital movements; it does, however, relate to the earnings thereon.
5. Corporation Tax is set at 50% and a one-year tax delay convention applies.

Thus, from Table 9.6 it is observed that :

(i) The first year RCB of £7407 is invested at the beginning of year 0 (a negative cash-flow) and recovered at the commencement of year 1 (a positive cash-flow). It is not reinvested again because the next lease repayment is effectively paid from it and so it diminishes in value by L_1, becoming the second residual capital balance (see Table 9.5).

(ii) During year 0-1, the RCB of £7407 has earned at a rate 'b' to yield £2221 at the end of year 0, the commencement of year 1. This is at once reinvested into the pool of working capital, but it is also subject to Corporation Tax at rate 'T' (50%, giving £1110 tax) which is deemed to be paid at the end of the following year (year 2) in accordance with the one-year tax delay procedure.

(iii) The reinvestment of the £2221 earnings during year 2, at the rate 'b', will yield a further £666 at the end of that year. Thus, at the end of year 2, there is available for reinvestment (£2221 + £666 - £1110) = £1777.

(iv) This process again provides a net result of zero cash-flow in all years except at the horizon where the accumulated net earnings are finally divested from the integrated project. There will also be produced a final tax charge in the year after the horizon arising out of the one year delay convention.

(v) Similar earnings pulses emanate from the RCB's generated in each year.

(vi) In the later periods of the project the RCB's will become negative, thereby acting as a further drain on working capital by demanding new injections of funds to support the remaining lease repayments. When this occurs an opportunity cost should be imputed to the RCB's because they are losing earning potential for the company. For example, taking the year 4 figure of positive £2965 it will be charged at an interest rate of 'b', producing an effective loss of earnings of (£889).

TABLE 9.6

COMPUTATION OF EARNINGS ON RESIDUAL CAPITAL BALANCES

TIME t	0	1	2	3	4	5		6
	(7407)	7407 2221 (2221)	2221 (1110) 666 1777 (1777)	1777 (333) 533 1977 (1977)	1977 (266) 593 2304 (2304)	2304 (297) 691 2693	H O R I Z O N	(345)
		(4814)	4814 1444 (1444)	1444 (722) 433 1155 (1155)	1155 (216) 346 1285 (1285)	1285 (173) 385 1497		(192)
			(2221)	2221 666 (656)	666 (333) 200 533 (533)	533 (100) 160 593	H O R I Z O N	(80)
				372	(372) (111) 111	(111) 55 (33) 89		16
					2965	(2965) (889)		444

Combining (vertically, year by year) the data from Table 9.6 the following aggregate series is achieved :

TABLE 9.7

AGGREGATED DATE: THE MOVEMENTS OF, AND AFTER TAX EARNINGS ON, RESIDUAL CAPITAL BALANCES

TIME t	0	1	2	3	4	5	6
AGGREGATE INVESTMENT AND DISINVESTMENT OF RESIDUAL CAPITAL BALANCES AND THEIR RESPECTIVE EARNINGS PULSES UP TO THE HORIZON, AFTER TAX.	(7407)	2593	2593	2593	2593	845	(157)

The operating cash-flows relating to the lease (the investment decision cash-flows excluding the Capital Allowance) are shown in the following Table and are taxed. Also shown are the implicit capital element in each lease repayment which will receive tax relief. It can be seen at t = o, in the operating cash-flow series, that no account is taken of the cost of the asset (for this is subsumed in the capital repayments of the lease schedule).

TABLE 9.8

TAXATION ON EARNING AND CAPITAL AT 50%

TIME t	0	1	2	3	4	5	6
OPERATING CASH-FLOWS	0	3000	4000	5000	3000	2000	
CORPORATION TAX AT 50%	-	-	(1500)	(2000)	(2500)	(1500)	(1000)
	0	3000	2500	3000	5000	5000	(1000)
CAPITAL RE-PAYMENTS IMPLICIT IN LEASE INSTALMENTS	(2593)	(1482)	(1704)	(1960)	(2254)		
TAX RELIEF AT 50%	-	-	1297	741	852	980	1127
	(2593)	(1482)	(407)	(1219)	(1402)	980	1127

Thus, having now completed the computation of the various elements of the "planned financing mix -- horizon compounding" algorithm, the subsections can be amalgamated to form the complete data for the integrated leased-investment project :

TABLE 9.9

INTREGRATED PROJECT DATA

HORIZON COMPOUNDING EARNINGS ASSUMPTION

TIME t	0	1	2	3	4	5	6
OPERATING CASH-FLOWS, NET OF TAX	0	3000	2500	3000	500	500	(1000)
CAPITAL REPAY-MENTS IMPLICIT IN LEASE INSTALMENTS AFTER TAX RELIEF	(2593)	(1482)	(407)	(1219)	(1402)	980	1127
INVESTMENT AND DISINVESTMENT OF RESIDUAL BALANCES AND THEIR RESPEC-TIVE EARNINGS PULSES AFTER TAX	(7407)	2593	2593	2593	2593	845	(157)
AFTER-TAX AGGREGATED DATA	(10,000)	4111	4686	4374	1691	2325	(30)

II THE ONE-YEAR EARNINGS ASSUMPTION -- A NUMERICAL EXAMPLE

Before making any analysis of this cash-flow stream or the purchase alternative, the one-year disinvestment assumption model will be considered. Using exactly the same data as the previous example and applying the modification (equation F) to the "planned financing mix" algorithm, the following Table can be constructed :

TABLE 9.10

COMPUTATION OF EARNINGS ON RESIDUAL CAPITAL BALANCES

ONE YEAR EARNINGS AND DISINVESTMENT FROM MODEL

TIME t:	0	1	2	3	4	5	6
	(7407)	7407 2221 (4814)	(1110) 4814 1444 (2221)	(722) 2221 666 372	(333) (372) (111) 2965	55 (2965) (889)	444
AGGREGATE CASH-FLOW	(7407)	4814	2927	2534	2149	(3799)	444

And, hence, because Table 9:8 still applies the following cash-flow streams can be combined for the integrated decision :

TABLE 9.11

INTEGRATED PROJECT DATA --- ONE YEAR EARNINGS ASSUMPTION

TIME t:	0	1	2	3	4	5	6
OPERATING CASH-FLOWS AFTER TAX	0	3000	2500	3000	500	500	(1000)
CAPITAL REPAYMENTS IMPLICIT IN LEASE INSTALMENTS AFTER TAX RELIEF	(2593)	(1482)	(407)	(1219)	(1402)	980	1127
INVESTMENT AND DISINVESTMENT OF RESIDUAL CAPITAL BALANCES AND THEIR RESPECTIVE ONE-YEAR EARNINGS PULSE AFTER TAX	(7407)	4814	2927	2534	2149	(3799)	444
AGGREGATED DATA AFTER TAX	(10,000)	6332	5020	4315	1247	(2319)	571

The analysis of this cash-flow series is also temporarily delayed until the next section 9.6.

III THE PURCHASE OPTION

In Table 9.12 the 'horizon compounding' assumption relating to the earning of the asset's Capital Allowance is evaluated. This data presents the gross earnings and the consequent taxation thereon as it accrues through the reinvestment process. As may be noted from the Table, at the end of each year the earnings from the Capital Allowance are aggregated and the net figure promptly reinvested. Thus, it may be observed that :

(i) As the Capital Allowance becomes available[1] it is promptly invested within the company's working capital at the beginning of year 2. It is subsequently disinvested or recovered at the commencement of year 3 (a positive cash-flow of £5000).

(ii) During year 2, the £5000 Capital Allowance has earned at a rate 'b' (30% before-tax) to yield £1500 at the end of year 2, the beginning of year 3. The total amount of £6500 is at once reinvested for a further year.

(iii) The investment of £6500 will generate earnings of £1950. A tax liability of £750 will also occur in this period which represents a 50% Tax rate on the previous year's earnings of £1500. The aggregate of £7700 is then reinvested.

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1. The value of the CA is £5000, derived as follows: £10,000 x 100% first year allowance x 50% Corporation Tax rate. As noted in Chapter 8, the two year delay experienced in receiving the CA arises because it will take one year for the asset to be displayed in the accounts and a further year before receipt occurs as a result of the one-year tax delay convention.

(iv) This process continues giving a net result of zero cash-flow in all years except the horizon when the accumulated net earnings are finally disinvested. There will also be a final post-horizon tax charge arising as a result of the one-year tax delay convention.

Thus, the 'buy' option cash-flows may be stated as :

TABLE 9.12

OPERATING CASH FLOWS WHEN PURCHASED INCLUDING THE EARNING ON THE ASSET'S CAPITAL ALLOWANCE

TIME t:	0	1	2	3	4	5		6
OPERATING CASH-FLOWS	(10,000)	3000	4000	5000	3000	2000		
CORPORATION TAX AT 50%			(1500)	(2000)	(2500)	(1500)		(1000)
AFTER-TAX OPERATING CASH-FLOWS	(10,000)	3000	2500	3000	500	500		(1000)
CAPITAL ALLOWANCE			5000					
			(5000)	5000				
PLUS ITS ASSOCIATED EARNINGS SCHEDULE AFTER TAX				1500			H	
				6500			O	
				(6500)	6500		R	
					1950		I	
					(750)		Z	
					7700		O	
					(7700)	7700	N	
						2310		
						(975)		(1105)
						9035		
TOTAL 'PURCHASE' AFTER TAX CASH-FLOW	(10,000)	3000	2500	3000	500	9535		(2105)

Thus, making the assumption that the after-tax cost of capital to the company, 'K' is 12%, then:

NPV(PURCHASE) @ 12% = 1464

9.6 ANALYSIS OF THE AGGREGATED DATA

A dominant question at issue in the evaluation of an integrated finance-investment project is the determination of the appropriate hurdle rate to apply to the joint cash-flow series.

The 'purchase, using own funds, option' comparison was discounted at the company's weighted average cost of capital prior to the introduction of leasing into the financial mix.

Clearly applying this discount rate to the lease alternatives would produce a suspect calculation. It was argued in Chapter 4 that this is not a very satisfactory approach because the use of Instalment Debt in the capital budgeting process will affect:

(i) the value of the weighted average; (ii) if the project that is leased is accepted it will change the marginal efficiency of the investment set; and (iii) it is always unpredictable at the outset of the analysis whether the limits of the company's cash-flow debt-supportive capacity will be reached and in consequence prevent the full 'softening' of the capital rationing constraint (should this occur the marginal efficiency of capital will be greater than the changing weighted average cost of capital).

The anticipated changes in the weighted average cost of capital present great computational and theoretical problems of much

complexity[1]: how much will it change by and in what direction, higher or lower?

If it is assumed that the hurdle rate rises then the analyst is faced with the serious problem of enumerating the effects of such a change upon not only the joint project but also upon all accepted and rejected projects which form the competing investment set. By raising the discount rate those projects currently in the 'accepted-group' will have their individual N.P.V's diminished (in comparison with the value they would have held had the discount rate not been altered). Furthermore, if the new rate changes sufficiently, it could precipitate a re-selection of the project set by rejecting certain projects which were previously acceptable.

A totally fluid situation then pertains which, if computer help is not available, will leave the analyst with a most extensive iterative problem of selecting and re-selecting the optimum complementary package of investment and financing schemes. It is feasible that circumstances could arise such that, in total, the loss of NPV to the project set brought about by the re-alignment of the discount rate could cancel out any potential gains to be made through leasing. It may follow, therefore, that the inability to make this important

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1. The major theoretical issue concerns the MM [100 & 101] vs traditional school debate on the shape of the cost of capital curve as the company's debt/equity proportion changes. Although argument is still to be seen in the literature on this topic, the ensuing text favours the suggested 'saucer-shaped' curve proposed by SOLOMONS [150]

calculation[1] results in the true 'net' NPV of the integrated project being somewhat exagerated.

Alternatively, it could be assumed that the hurdle rate decreases (possibly as a result of the positive effects of financial leverage) in which case the same problem of quantification arises; except in this case the results will be beneficial to the company because the use of leasing will have contributed towards increasing the NPV of the remainder of the accepted project set.

It may be pessimistically concluded, therefore, that ANY lease analysis which uses the weighted average cost of capital as a hurdle rate cannot produce a totally satisfactory and unchallengeable decision rule : the interdependencies and computational complexities involved are too critical to be ignored yet often too intricate to be modelled. Thus, in this attempt to develop a lease algorithm within the rigours of accepted capital budgeting theory and techniques, the appraisal acceptance criterion which has to be applied is only partially satisfactory because of a basic inability to specify the correct discount rate. And, hence, a truly accurate financial statement such as leasing is £X's NPV superior to purchase cannot be produced.

It is most important to state, however, that while the evaluation procedures developed here are exposed to the criticism mentioned in

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1. Unfortunately, the evaluation of this potential loss is almost impossible to quantify without advanced mathematical programming methods. Realistic computations of this kind cannot be fully represented in an individual, multi-period, lease analysis conducted manually.

the preceeding paragraph, they are nevertheless a most effective technique for providing management with a more meaningful albeit ORDINAL, solution to the choice of alternative lease contracts and to the lease or buy, or lease or borrow decision.

Mindful of the foregoing, the evaluation of the two "planned financing mix" cash-flow streams can now be compared with the result of NPV (PURCHASE) which was 1464. Thus, from Tables 9.9 and 9.11 it is found that :

"HORIZON COMPOUNDING" EARNING ASSUMPTION : NPV LEASE @ 12% = 2900

"ONE-YEAR" EARNINGS ASSUMPTION : NPV LEASE @ 12% = 2495

Both options exceed the purchase alternative and so in these circumstances leasing should be undertaken and management should allow the earnings from the residual capital balances to remain in working capital until the termination of the joint project at the horizon.

9.7 SENSITIVITY ANALYSIS ON THE "PLANNED FINANCING MIX" ALGORITHMS

To obtain an overall impression of the interaction of the various parameters in the decision models it is possible to test each algorithm at various value of 'i' and 'b', respectively, the implicit interest rate of the associated lease contract and the earnings rate on the residual capital balances.

Adopting the standard investment project used in this Chapter and keeping the discount rate constant at 12% after-tax, it is possible to establish the following sensitivity date : shown in Tables 9.13 and 9.14, and graphed in Figure 9.1.

TABLE 9.13

SENSITIVITY ANALYSIS ON THE 'HORIZON' COMPOUNDING ALGORITHM,

NET PRESENT VALUE OF THE INTEGRATED PROJECT AT 12%

		IMPLICIT INTEREST RATE OF LEASE 'i'					
		5%	10%	15%	20%	25%	30%
RESIDUAL BALANCES REINVESTMENT RATE 'b'	5%	619	809	986	1164	1337	1497
	10%	952	1089	1217	1346	1470	1584
	15%	1359	1439	1512	1586	1655	1719
	20%	1853	1869	1881	1894	1904	1911
	25%	2448	2398	2340	2283	2226	2172
	30%	3157	3024	2900	2765	2635	2512
	35%	3998	3779	3567	3355	3144	2945

TABLE 9.14

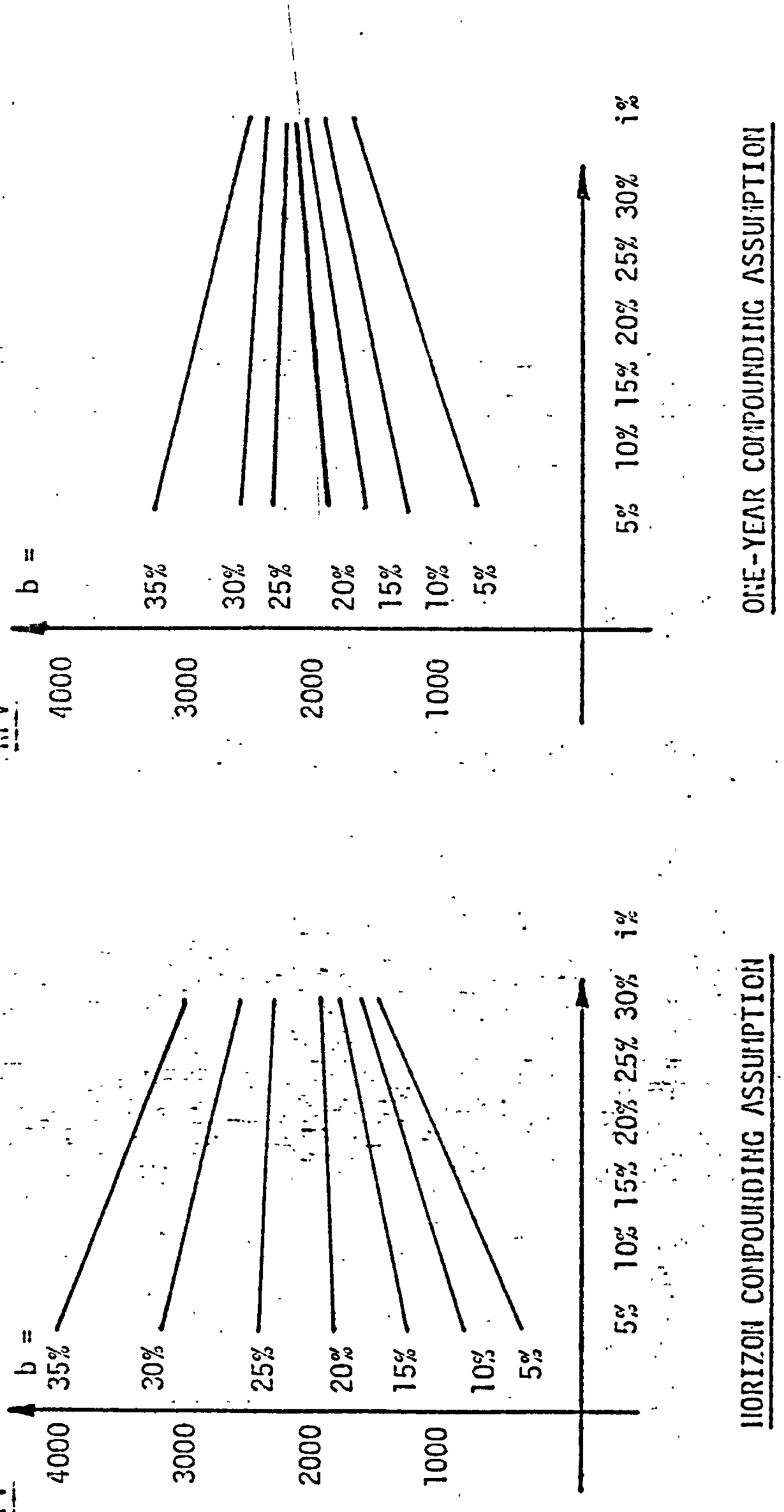
SENSITIVITY ANALYSIS ON THE 'ONE-YEAR' COMPOUNDING ALGORITHM,

NET PRESENT VALUE OF THE INTEGRATED PROJECT AT 12%

RESIDUAL BALANCES REINVESTMENT RATE 'b'	IMPLICIT INTEREST RATE OF LEASE 'i'					
	5%	10%	15%	20%	25%	30%
5%	740	920	1091	1259	1423	1575
10%	1130	1254	1370	1485	1597	1700
15%	1530	1583	1650	1712	1771	1824
20%	1910	1922	1930	1939	1945	1949
25%	2300	2256	2211	2166	2119	2073
30%	2690	2590	2495	2392	2293	2198
35%	3080	2924	2771	2619	2466	2323

FIGURE 9.1

SENSITIVITY ANALYSIS ON THE RESIDUAL CAPITAL BALANCES ALGORITHMS



The following inferences may be drawn from the graphical representation of the sensitivity data illustrated in Figure 9.1. If T equals the Corporation Tax rate, it will be noted from the exemplar project that :

1. For a given value of 'b' such that, $b(1-T)>K$, the after-tax earnings rate on working capital is higher than the after-tax weighted average cost of capital, then the lower the cost of the lease the higher the NPV of the integrated project.
2. For a given value of 'b' such that, $b(1-T)<K$, the after-tax earnings rate on working capital is lower than the weighted average cost of capital, then the higher the cost of the lease the higher the NPV of the integrated project.
3. Notionally there is an indifference level at, $b(1-T) = K$, that is b = 24%, K = 12%, T = 50%. However, due to the effect of tax lags etc., the NPV is not exactly horizontal at these parameters. Under these circumstances the cost of the lease would appear to be immaterial (although economic logic would suggest that the cheapest lease be selected, the algorithm does not automatically indicate this). The stable value of the integrated project's NPV reflects the neutralizing effect on the RCB earnings caused by compounding and discounting at an equivalent rate.

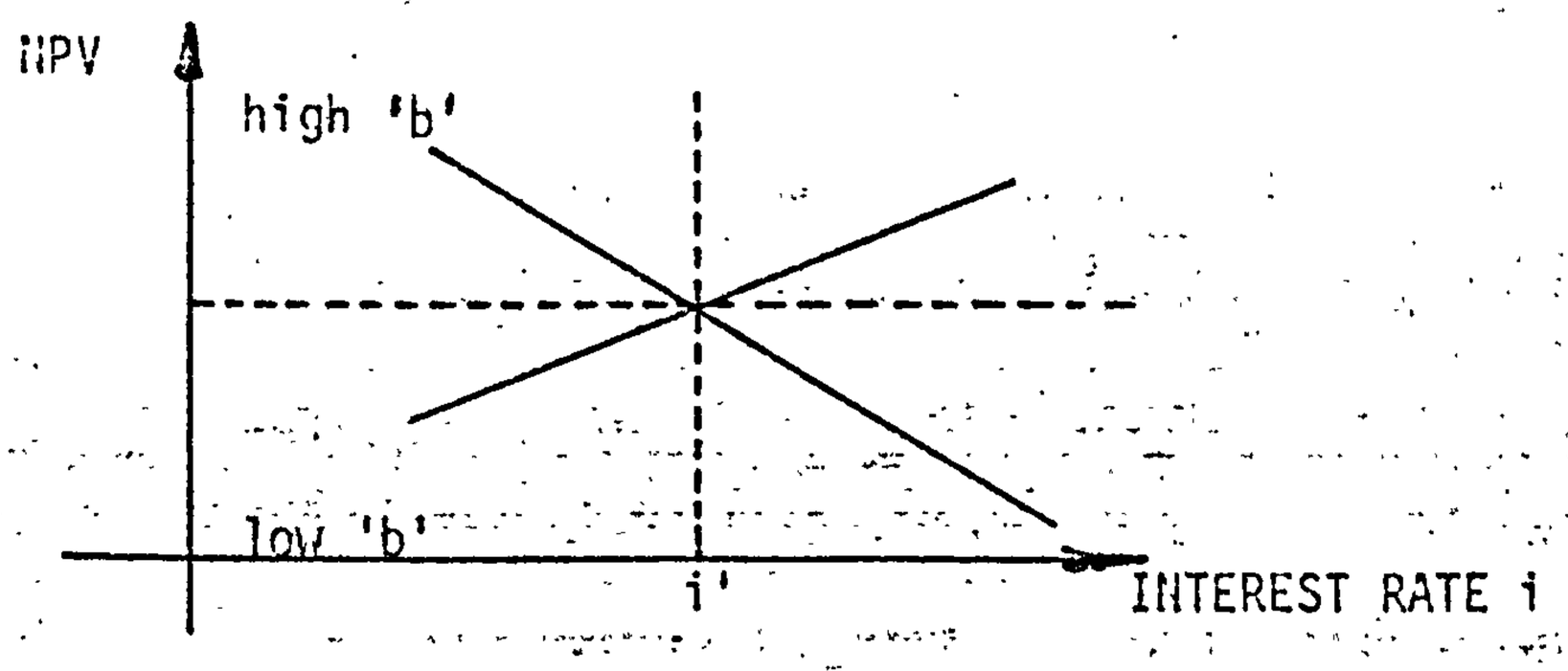
It should be stressed, however, that the above deductions refer to constant repayment lease schedules for a given investment project. The real value of the algorithms presented above is their capacity to select between competing and fluctuating

lease repayment patterns -- which is a far more difficult and subtle comparison.

One further point may be raised concerning the data under discussion. It is possible that the configuration of the repayment profile may be such that the NPV curves cross within the band of feasible interest rates. It may be added in parentheses that the researcher has not experienced this 'phenomenon' during experimentation with the algorithm using typical implicit interest rate lease contracts, but intersections are quite feasible at what are perhaps unrealistic rates. Nevertheless, the following hypothetical situation could arise :

FIGURE 9.2

PLANNED FINANCING MIX INTERSECTION



The cross-over point[1] at i' would have the following consequence on the choice of competing lease contracts :

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1 . This is similar in effect to a "fisherian intersection" ("Rate of Return Over Cost"); see FISHER [56, Ch.7]

if i<i' it is better for the company to have a higher value of b; if i>i' it is better to have a lower value of b. The major conclusion to be drawn from the possibility of an intersection is that the implicit interest rate of a lease is not necessarily the crutial parameter in the leasing decision, and in fact it may be misleading.

9.8 "SPILL-OVER"

The Industrial Survey revealed that the leasing strategy termed "spill-over" occurs under two important and concurrent conditions:

1. The company resorts to leasing because its other financial resources are heavily committed elsewhere in the organisation to such an extent that their normal sources of debt are almost exhausted, or are <u>believed</u> to be exhausted; and,
2. Typically this would occur in-between two capital budgeting exercises in a totally random manner with the asset in question being considered, for urgent strategic or production reasons, to be of sufficient importance to receive top priority for capital -- in whatever form is most readily available or negotiable.

Management may possibly have small pockets of debt available[1] and it may be actively considering an attempt to secure a major tranche of capital in the near future to remedy the current

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1. Say, the remaining overdraft facility which it intends to preserve as a strategic reserve of financial mobility; see section 4.7 II, Chapter 4.

situation, BUT AT THE MOMENT OF DECISION there was no immediate alternative methods of financing.[1] It follows, therefore, that the relevant selection criterion becomes one of determining the most suitable leasing contract : that is, a "Lease A versus Lease B" decision. The second stipulation concerning "spill-over" leasing is most significant in distinguishing it from "planned financing mix" and its associated RCB's. The issue revolves around the analysis of a lease within a simultaneous investment and financing decision set -- the full capital budgeting appraisal for a given year -- and the isolated, totally detached leasing decision. As previously argued, with "planned financing mix" the use of leasing effectively releases funds for investment elsewhere in the organisation. However, with "spill-over" leasing there are no funds available to be released. The decision and its consequences stand alone and so no residual capital balances can accrue to the joint project.

In order to solve the "spill-over" problem it is necessary to adopt a technique which, by virtue of the circumstances, is forced to look at the leasing decision in isolation from the normal capital budget, but none the less maintain the integrated form of analysis with the investment decision.

The "spill-over" algorithm can be extracted from the "planned financing mix" procedure by simply removing the equations relating to the RCB's (namely eliminate expressions C, D and E).

The relevant decision parameters are then quite simply the

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1. It will be noted from Chapter 4, when the debt-supportive capacity of cash-flows and LINKAGE-LEASING were discussed, that companies are expected to maintain a contingency cash-flow reserve for emergencies. The funds necessary to initiate a lease contract in "spill-over" conditions are drawn from this pool (which clearly is finite).

operating revenues and costs plus the capital repayment series implicit in the lease contract. It may be noted in the light of the previous discussion of double counting in the "planned financing mix" algorithm, that the "spill over" equations do not perforce contain any opportunity benefits or costs and as such cannot be said to double count any cash-flow. An illustration of this technique can be obtained simply by selecting the appropriate data from the "planned financing mix" example previously illustrated (Table 9.8 contains the relevant after-tax cash-flow series).

A sensitivity analysis can be performed on the exemplar investment project using different implicit interest rates for associated constant repayment lease contracts. Thus :

TABLE 9.15

SENSITIVITY ANALYSIS ON THE "SPILL-OVER" ALGORITHM USING THE EXEMPLAR INVESTMENT OPPORTUNITY

	IMPLICIT INTEREST RATE OF LEASE 'i'					
	5%	10%	15%	20%	25%	30%
NPV OF INTEGRATED PROJECT AT 12%	2041	2040	2026	2019	2005	1992

The resulting NPV is remarkably stable throughout the range of interest rates shown, primarily because the implicit interest cost has been removed from the lease repayment schedule. The

only difference between competing contracts is the time profile of the capital instalments which, although summing to equivalent amounts will be biased towards the front or end of the contract according to the interest rate charged.

Thus, within the "spill-over" circumstances shown above it is quite clear that management should choose the cheapest lease available; a conclusion which accords with intuitive judgement. However, given the opportunity to negotiate 'tailor-made' contracts the resulting pattern of capital repayments is the critical factor in deciding which is the most attractive lease. It should also be noted as before that this analysis requires a known discount rate which leaves unresolved the interdependency between the injection of new lease finance and the weighted average cost of capital. The repercussions of the decision to lease will influence the hurdle rate to be applied to all projects but, unfortunately, these effects are difficult to quantify in an isolated decision procedure.

9.9 CONCLUSION

Capital budgeting is now increasingly recognised as a study of the simultaneous investment, financing (and indeed taxation) decisions. However, it is also widely acknowledged that there exists many theoretical, practical and computational difficulties which prevent the development of a totally satisfactory, all-encompassing, corporate decision model. Arguably this is an unattainable Utopia, thwarted by the many interdependencies and interrelationships which are ever present in financial

management. Although these problems may be recognised and adequately documented, they are not as yet capable of precise quantification.

These are most serious obstacles which impede the development of algorithms to solve the leasing decision : for if the theoretical and operational evolution of an overall solution to the integrated I. & F. decision is incomplete, then the task of refining and fragmenting such a methodology down to an individual lease appraisal technique is both conceptually weak and prone to raise more issues than it solves. Not surprisingly therefore, the leasing decision has attracted much scholarly debate in recent years, for it lies at the very nucleus of academic progress towards an integration of the I. & F. decision. It is quite apparent, however, that this trend has not produced a consensus of opinion as to how a lease should be evaluated; indeed quite the contrary, it has led to confusion and misunderstanding on the part of those executives who are empowered to make the leasing decision. In the judgement of the writer, based upon the experience gained during the Industrial Survey, far too many discussions on leasing have pursued solutions which are too theoretical : with the commensurate problem that they are incapable of being successfully applied within the industrial and commercial confines in which they are expected to be used. No matter how desirable and theoretically essential some parameters may be, it is erroneous to assume that when a finance director makes a leasing decision he will have instant access to linkage dual values, market

determined risk-return discount rates for specific projects, or a knowledge of precise variations in the weighted average cost of capital or marginal efficiency of capital as they change in response to the use of leasing.

In consequence, the philosophy behind the proposed RCB technique is to produce an independent lease appraisal method which is robust enough for everyday application -- which by implication means that it will be computationally and economically efficient, but with many of the refinements of mathematical programming having been relinquished. As such, the RCB technique is clearly exposed to the criticism that it is not the "exact" solution. This is not repudiated. Hopefully, however, the series of arguments presented throughout the Thesis will have satisfied the reader that a rigorously correct solution which is capable of being used in practice, cannot currently be achieved. Needless to say, when and if many of the interdependencies which interact with the leasing decision are fully clarified and measured, then the decision criterion itself will progressively become more accurate.

The application of the "planned financing mix" and "spill-over" algorithms are intended to provide a much clearer guide to the consequences of adopting a particular leasing strategy. The concept of residual capital balances enables management for the first time to carefully assess and quantify the implications of each fluctuating lease contract upon the total profitability of the project set. The research has established that the evaluation of a lease is situation dependent and that each

repayment schedule has a significantly different impact upon the present and future capital budgets. However, in the pursuit of this objective it has been necessary to devise an opportunity cost solution to express the financial consequences of adopting a planned leasing strategy. By implication, therefore, it becomes essential to establish the correct basis for equitable comparison with other competing sources of funds. The most dependable comparison will be between alternative leasing contracts because they are absolutely equivalent financing instruments (their individual contribution being measured by the profile of the capital content of the lease repayments and the earnings potential of their RCB's).

However, the problems of correct comparison are more acute when leasing is being compared with the outright purchase acquisition of the asset using internally generated funds. In this case it is essential that the analyst considers the secondary investment opportunity created by the asset's Capital Allowance, as an explicit calculation, if an impartial selection of financing instruments is to be made.

Clearly, this procedure is somewhat artificial, but so too is the comparison being made. The doctrine of capital budgeting that 'like must be compared with like', would preclude the "lease vs. buy" analysis on the grounds of incompatibility. Yet companies perform such appraisals daily -- and even if they carry it out incorrectly, it none the less represents the type of information which is constantly requested.

Finally, it will be noted that the RCB technique does not incorporate an equation to assess the effect of the lease upon the exploitation of free cash-flow. To do so would require a complex 'dual-like' augmentation to the algorithm. Unfortunately, however, the literature has not yet produced a practical adjustment to the standard NPV criterion which could be added to the individual I. & F. decision. When this is accomplished it will provide a most valuable indicator of the additional hidden benefits of leasing.

In conclusion the following topics may prove fruitful areas of research which will make a noteworthy contribution to the understanding of the leasing decision and the role of leasing within corporate financing strategy and debt management:

(i) resolution of the many interdependencies which impinge upon the analysis of a lease, particularly the discount rate paradox;

(ii) a development of current investment and financing decision models so that the individual integrated decision may benefit -- notably, a resolution of the horizon problem and the pre-determined discount rate; an incorporation of realistic taxation policies; other problems include data specification, evaluation procedures, the model's constraints and authentic financing policies;

(iii) a closer investigation of the linkage-leasing proposal with the possible formulation of a basic working model capable of being computerised;

(iv) further exploration of the empirical study initiated in this research programme to examine the ever evolving

attitudes towards leasing strategy and appraisal;

(v) a search for a possible simplification of the planned financing mix algorithm -- and perhaps the construction of planned financing mix standard Tables for constant lease contracts covering normal bands of interest rates and time periods;

(vi) and finally, further research into the problem of incorporating dual values into single decision criteria, especially the effects of linkage upon the leasing decision.

APPENDIX NO. I

NOMINAL INTEREST RATE TABLES

COMPRISING OF LEASE CONTRACTS WITH MONTHLY, QUARTERLY, HALF YEARLY AND ANNUAL UNIFORM REPAYMENT SCHEDULES.

ZERO PERCENT TAX

TABLE NO. 1 MONTHLY REPAYMENTS
TABLE NO. 2 QUARTERLY REPAYMENTS
TABLE NO. 3 HALF YEARLY REPAYMENTS
TABLE NO. 4 ANNUAL REPAYMENTS

50% CORPORATE TAX RATE

TABLE NO. 5 MONTHLY REPAYMENTS
TABLE NO. 6 QUARTERLY REPAYMENTS
TABLE NO. 7 HALF YEARLY REPAYMENTS
TABLE NO. 8 ANNUAL REPAYMENTS

50% CORPORATE TAX RATE INCLUDING CAPITAL ALLOWANCES

TABLE NO. 9 MONTHLY REPAYMENTS
TABLE NO.10 QUARTERLY REPAYMENTS
TABLE NO.11 HALF YEARLY REPAYMENTS
TABLE NO.12 ANNUAL REPAYMENTS

TABLE No. 1

Present Worth of £1 due M times per Annum
After N Years at I percent Interest

MONTHLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate ---------- Zero Percent Tax												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	12	11.730	11.677	11.624	11.572	11.521	11.469	11.418	11.368	11.317	11.267	11.218	11.168	11.120
2	24	22.889	22.676	22.465	22.258	22.053	21.851	21.625	21.456	21.262	21.071	20.882	20.696	20.512
3	36	33.505	33.035	32.575	32.124	31.683	31.249	30.825	30.408	30.000	29.600	29.208	28.823	28.446
4	48	43.604	42.793	42.004	41.235	40.486	39.757	39.046	38.354	37.679	37.021	36.361	35.756	35.147
5	60	53.211	51.984	50.796	49.647	48.535	47.460	46.415	45.405	44.426	43.478	42.560	41.670	40.807
6	72	62.351	60.641	58.997	57.415	55.893	54.428	53.019	51.662	50.355	49.096	47.884	46.715	45.888
7	84	71.047	68.795	66.644	64.587	62.620	60.739	58.938	57.215	55.565	53.984	52.470	51.018	49.627
8	96	79.318	76.476	73.775	71.209	68.770	66.451	64.244	62.143	60.143	58.237	56.421	54.690	53.038
9	108	87.188	83.710	80.426	77.325	74.392	71.621	68.999	66.516	64.165	61.937	59.825	57.821	55.919
10	120	94.674	90.524	86.629	82.971	79.534	76.302	73.261	70.397	67.700	65.157	62.757	60.493	58.353
11	132	101.796	96.942	92.413	88.185	84.233	80.539	77.081	73.842	70.806	67.958	65.284	62.772	60.409
12	144	108.571	102.987	97.807	92.999	88.530	84.374	80.504	76.898	73.535	70.395	67.461	64.716	62.145

TABLE No. 1 (cont.)

Present Worth of £1 due M times per Annum
After N Years at I percent Interest

MONTHLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate ---------- Zero Percent Tax												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	12	11.071	11.023	10.975	10.927	10.880	10.833	10.787	10.741	10.695	10.649	10.604	10.559	10.514
2	24	20.331	20.152	19.975	19.801	19.629	19.460	19.292	19.127	18.964	18.803	18.644	18.487	18.332
3	36	28.075	27.712	27.356	27.007	26.665	26.328	25.999	25.675	25.357	25.046	24.740	24.440	24.145
4	48	34.553	33.974	33.410	32.859	32.322	31.798	31.286	30.788	30.301	29.826	29.362	28.909	28.467
5	60	39.971	39.160	38.374	37.611	36.871	36.153	35.456	34.780	34.123	33.486	32.867	32.265	31.681
6	72	44.502	43.455	42.444	41.470	40.529	39.621	38.744	37.897	37.079	36.288	35.524	34.785	34.071
7	84	48.292	47.012	45.783	44.603	43.470	42.382	41.336	40.330	39.364	38.434	37.538	36.677	35.848
8	96	51.462	49.958	48.521	47.148	45.836	44.581	43.380	42.231	41.131	40.077	39.066	38.098	37.169
9	108	54.113	52.397	50.766	49.214	47.737	46.331	44.992	43.715	42.497	41.334	40.225	39.165	38.151
10	120	56.331	54.418	52.607	50.892	49.267	47.725	46.262	44.873	43.553	42.297	41.103	39.965	38.882
11	132	58.186	56.091	54.117	52.255	50.497	48.835	47.264	45.778	44.370	43.035	41.769	40.567	39.425
12	144	59.737	57.477	55.356	53.362	51.486	49.719	48.054	46.484	45.001	43.600	42.274	41.018	39.829

TABLE No. 2

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

QUARTERLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate —— Zero Percent Tax												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	4	3.926	3.912	3.898	3.884	3.870	3.856	3.842	3.829	3.815	3.802	3.788	3.775	3.762
2	8	7.663	7.598	7.535	7.472	7.410	7.349	7.289	7.230	7.172	7.114	7.058	7.002	6.947
3	12	11.218	11.071	10.927	10.787	10.649	10.514	10.382	10.253	10.126	10.001	9.880	9.760	9.643
4	16	14.600	14.343	14.093	13.849	13.612	13.381	13.157	12.938	12.725	12.517	12.315	12.118	11.926
5	20	17.819	17.426	17.046	16.678	16.323	15.979	15.646	15.324	15.012	14.710	14.417	14.134	13.859
6	24	20.882	20.331	19.801	19.292	18.803	18.332	17.879	17.444	17.024	16.620	16.231	15.857	15.496
7	28	23.796	23.068	22.372	21.707	21.071	20.464	19.883	19.327	18.795	18.285	17.797	17.329	16.881
8	32	26.569	25.646	24.770	23.938	23.147	22.395	21.681	21.000	20.353	19.736	19.149	18.588	18.054
9	36	29.208	28.075	27.007	25.999	25.046	24.145	23.293	22.487	21.724	21.001	20.315	19.665	19.047
10	40	31.718	30.364	29.095	27.903	26.783	25.730	24.740	23.808	22.930	22.102	21.322	20.584	19.888
11	44	34.107	32.521	31.042	29.661	28.372	27.166	26.038	24.982	23.992	23.063	22.190	21.370	20.600
12	48	36.381	34.553	32.859	31.286	29.826	28.467	27.203	26.025	24.926	23.899	22.940	22.043	21.202

TABLE No. 2 (Cont.)

Present Worth of £1 due M Times per Annum after N Years at I Percent Interest

QUARTERLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate——Zero Percent Tax												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	4	3.749	3.736	3.723	3.710	3.698	3.685	3.673	3.661	3.648	3.636	3.624	3.612	3.600
2	8	6.893	6.839	6.786	6.734	6.683	6.632	6.582	6.533	6.484	6.436	6.389	6.343	6.297
3	12	9.529	9.416	9.306	9.198	9.092	8.989	8.887	8.787	8.689	8.593	8.499	8.406	8.315
4	16	11.739	11.557	11.380	11.206	11.037	10.873	10.712	10.555	10.403	10.253	10.108	9.966	9.827
5	20	13.593	13.335	13.085	12.843	12.608	12.379	12.158	11.943	11.735	11.532	11.336	11.144	10.959
6	24	15.148	14.812	14.488	14.176	13.875	13.584	13.303	13.032	12.770	12.517	12.272	12.035	11.807
7	28	16.451	16.039	15.643	15.263	14.898	14.547	14.210	13.886	13.575	13.275	12.987	12.709	12.441
8	32	17.544	17.058	16.593	16.149	15.724	15.318	14.909	14.557	14.201	13.859	13.532	13.218	12.917
9	36	18.461	17.904	17.374	16.870	16.390	15.934	15.498	15.083	14.687	14.309	13.948	13.602	13.272
10	40	19.230	18.607	18.017	17.458	16.929	16.426	15.949	15.496	15.065	14.655	14.265	13.893	13.539
11	44	19.874	19.190	18.546	17.937	17.363	16.820	16.306	15.820	15.359	14.922	14.507	14.113	13.738
12	48	20.415	19.675	18.981	18.328	17.713	17.135	16.589	16.074	15.587	15.127	14.691	14.279	13.888

TABLE No. 3

Present Worth of £1 due M Times per Annum after N Years at I Percent Interest

HALF–YEARLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate—— Zero Percent Tax												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	2	1.975	1.971	1.966	1.961	1.957	1.952	1.948	1.943	1.939	1.934	1.930	1.926	1.922
2	4	3.856	3.829	3.802	3.775	3.749	3.723	3.698	3.673	3.648	3.624	3.600	3.577	3.554
3	6	5.646	5.580	5.515	5.452	5.390	5.329	5.270	5.212	5.155	5.100	5.046	4.993	4.941
4	8	7.349	7.230	7.114	7.002	6.893	6.786	6.683	6.582	6.484	6.389	6.297	6.206	6.118
5	10	8.971	8.786	8.608	8.435	8.269	8.108	7.952	7.802	7.656	7.515	7.379	7.247	7.119
6	12	10.514	10.253	10.001	9.760	9.529	9.306	9.092	8.887	8.689	8.499	8.315	8.139	7.969
7	14	11.983	11.635	11.303	10.986	10.683	10.393	10.117	9.853	9.600	9.357	9.126	8.904	8.691
8	16	13.381	12.938	12.517	12.119	11.739	11.380	11.037	10.712	10.403	10.108	9.827	9.559	9.304
9	18	14.712	14.166	13.651	13.166	12.707	12.274	11.864	11.477	11.111	10.763	10.434	10.121	9.825
10	20	15.979	15.324	14.710	14.134	13.593	13.085	12.608	12.158	11.735	11.336	10.959	10.604	10.268
11	22	17.184	16.415	15.698	15.029	14.405	13.821	13.275	12.764	12.285	11.835	11.413	11.017	10.644
12	24	18.332	17.444	16.620	15.857	15.148	14.488	13.875	13.303	12.770	12.272	11.807	11.371	10.963

TABLE No. 3 (Cont.)

Present Worth of £1 due M Times per Annum after N Years at I Percent Interest

HALF-YEARLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate-- Zero Percent Tax												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	2	1.917	1.913	1.909	1.905	1.901	1.899	1.893	1.889	1.885	1.881	1.877	1.873	1.869
2	4	3.531	3.509	3.487	3.465	3.444	3.423	3.402	3.381	3.361	3.341	3.322	3.302	3.283
3	6	4.890	4.840	4.791	4.743	4.696	4.650	4.605	4.561	4.517	4.475	4.433	4.392	4.352
4	8	6.033	5.950	5.868	5.789	5.712	5.637	5.564	5.492	5.423	5.355	5.288	5.223	5.160
5	10	6.995	6.875	6.759	6.646	6.537	6.431	6.328	6.228	6.132	6.038	5.946	5.858	5.772
6	12	7.805	7.647	7.495	7.348	7.206	7.070	6.938	6.810	6.687	6.568	6.453	6.341	6.233
7	14	8.487	8.291	8.103	7.923	7.750	7.583	7.423	7.270	7.122	6.979	6.842	6.710	6.583
8	16	9.061	8.828	8.606	8.394	8.191	7.997	7.811	7.633	7.462	7.299	7.142	6.992	6.847
9	18	9.544	9.276	9.021	8.779	8.549	8.329	8.120	7.920	7.729	7.547	7.373	7.206	7.047
10	20	9.950	9.649	9.365	9.095	8.839	8.596	8.366	8.146	7.938	7.739	7.550	7.370	7.198
11	22	10.292	9.961	9.649	9.354	9.075	8.811	8.562	8.325	8.101	7.889	7.687	7.495	7.312
12	24	10.580	10.221	9.883	9.565	9.266	8.984	8.718	8.467	8.230	8.005	7.792	7.590	7.399

TABLE No. 4

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

ANNUAL REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate — Zero Percent Tax												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2	1.952	1.943	1.934	1.926	1.917	1.909	1.901	1.893	1.885	1.877	1.869	1.862	1.855
3	3	2.859	2.833	2.808	2.783	2.759	2.735	2.712	2.690	2.668	2.647	2.626	2.605	2.585
4	4	3.723	3.673	3.624	3.577	3.531	3.487	3.444	3.402	3.361	3.322	3.283	3.246	3.209
5	5	4.546	4.465	4.387	4.312	4.240	4.170	4.102	4.037	3.974	3.914	3.855	3.798	3.743
6	6	5.329	5.212	5.100	4.993	4.890	4.791	4.696	4.605	4.517	4.433	4.352	4.274	4.199
7	7	6.077	5.917	5.766	5.623	5.486	5.355	5.230	5.111	4.997	4.889	4.784	4.685	4.589
8	8	6.786	6.582	6.389	6.206	6.033	5.868	5.712	5.564	5.423	5.288	5.160	5.039	4.922
9	9	7.463	7.210	6.971	6.747	6.535	6.335	6.146	5.968	5.799	5.639	5.487	5.344	5.207
10	10	8.108	7.802	7.515	7.247	6.995	6.759	6.537	6.328	6.132	5.946	5.771	5.606	5.450
11	11	8.722	8.360	8.023	7.710	7.418	7.144	6.889	6.650	6.426	6.216	6.019	5.833	5.659
12	12	9.306	8.887	8.499	8.139	7.805	7.495	7.206	6.938	6.687	6.453	6.234	6.029	5.836

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TABLE No. 4 (cont.)

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

ANNUAL REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate-- Zero Percent Tax												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2	1.847	1.840	1.833	1.826	1.820	1.813	1.806	1.800	1.793	1.787	1.781	1.775	1.769
3	3	2.566	2.546	2.528	2.509	2.491	2.474	2.457	2.440	2.423	2.407	2.392	2.376	2.361
4	4	3.174	3.140	3.106	3.074	3.042	3.011	2.981	2.952	2.923	2.895	2.868	2.842	2.816
5	5	3.690	3.639	3.589	3.540	3.494	3.448	3.404	3.362	3.320	3.280	3.241	3.203	3.166
6	6	4.127	4.058	3.991	3.926	3.864	3.803	3.745	3.689	3.635	3.583	3.532	3.483	3.435
7	7	4.498	4.410	4.325	4.245	4.167	4.092	4.020	3.951	3.885	3.821	3.759	3.700	3.643
8	8	4.811	4.706	4.604	4.508	4.415	4.327	4.242	4.161	4.083	4.009	3.937	3.868	3.802
9	9	5.077	4.954	4.837	4.725	4.619	4.518	4.421	4.329	4.241	4.156	4.076	3.998	3.925
10	10	5.303	5.163	5.031	4.903	4.786	4.673	4.565	4.463	4.365	4.273	4.184	4.099	4.019
11	11	5.494	5.339	5.192	5.054	4.923	4.799	4.682	4.570	4.465	4.364	4.269	4.178	4.091
12	12	5.656	5.486	5.327	5.177	5.035	4.902	4.776	4.656	4.543	4.436	4.335	4.239	4.147

TABLE No. 5

Present Worth of £1 due M times per Annum
After N Years at I percent Interest

MONTHLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate ----- 50% Corporate Tax Rate												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	12	6.288	6.337	6.383	6.428	6.471	6.510	6.548	6.585	6.619	6.650	6.681	6.709	6.735
2	24	12.264	12.298	12.326	12.351	12.370	12.384	12.393	12.402	12.405	12.407	12.400	12.393	12.382
3	36	17.946	17.905	17.859	17.807	17.749	17.684	17.616	17.541	17.463	17.381	17.367	17.206	17.114
4	48	23.341	23.179	23.010	22.834	22.653	22.476	22.467	22.082	21.885	21.686	21.465	21.283	21.079
5	60	28.471	28.140	27.804	27.465	27.124	26.783	26.437	26.094	25.750	25.409	25.070	24.734	24.400
6	72	33.527	32.807	32.269	31.732	31.200	30.672	30.151	29.627	29.129	28.629	28.139	27.657	27.482
7	84	37.982	37.197	36.424	35.663	34.915	34.184	33.467	32.766	32.082	31.414	30.763	30.129	29.512
8	96	42.385	44.326	40.291	39.283	38.303	37.351	36.427	35.531	34.663	33.822	33.009	32.223	31.463
9	108	46.572	45.210	43.892	42.620	41.391	40.207	39.069	37.972	36.917	35.893	34.930	33.994	33.096
10	120	50.550	48.863	47.244	45.693	44.207	42.786	41.427	40.128	38.888	37.704	36.572	35.493	34.463
11	132	54.331	52.299	50.364	48.524	46.773	45.111	43.532	42.033	40.610	39.259	37.978	36.762	35.607
12	144	57.924	55.531	53.268	51.132	49.113	47.206	45.410	43.714	42.114	40.604	39.179	37.834	36.563

TABLE No. 5 (cont.)

Present Worth of £1 due M times per Annum
After N Years at I percent Interest

MONTHLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate--- 50% Corporate Tax Rate												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	12	6.761	6.786	6.808	6.829	6.849	6.867	6.885	6.901	6.916	6.929	6.942	6.953	6.964
2	24	12.370	12.354	12.336	12.316	12.294	12.270	12.243	12.215	12.185	12.154	12.121	12.086	12.051
3	36	17.019	16.922	16.823	16.723	16.621	16.516	16.412	16.305	16.198	16.090	15.983	15.873	15.763
4	48	20.875	20.670	20.466	20.262	20.058	19.855	19.652	19.452	19.252	19.054	18.857	18.662	18.469
5	60	24.070	23.743	23.421	23.102	22.787	22.477	22.172	21.871	21.575	21.284	20.998	20.716	20.440
6	72	26.718	26.263	25.816	25.381	24.954	24.537	24.129	23.730	23.341	22.960	22.589	22.227	21.874
7	84	28.911	28.328	27.760	27.208	26.672	26.152	25.647	25.156	24.681	24.220	23.771	23.276	22.915
8	96	30.729	30.020	29.335	28.674	28.036	27.420	26.826	26.252	25.699	25.165	24.648	24.151	23.670
9	108	32.233	31.405	30.611	29.848	29.116	28.413	27.739	27.092	26.470	25.872	25.299	24.748	24.217
10	120	33.480	32.541	31.645	30.789	29.973	29.192	28.446	27.734	27.054	26.402	25.780	25.183	24.613
11	132	34.511	33.470	32.482	31.543	30.651	29.802	28.994	28.227	27.496	26.800	26.136	25.503	24.899
12	144	35.365	34.231	33.160	32.146	31.187	30.279	29.418	28.603	27.830	27.096	26.398	25.735	25.105

TABLE No. 6

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

QUARTERLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate—50% Corporate Tax Rate												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	4	2.112	2.132	2.151	2.169	2.187	2.203	2.219	2.235	2.249	2.263	2.275	2.289	2.300
2	8	4.121	4.139	4.155	4.170	4.182	4.193	4.203	4.212	4.220	4.226	4.231	4.234	4.237
3	12	6.031	6.027	6.022	6.015	6.004	5.992	5.980	5.964	5.947	5.928	5.909	5.888	5.866
4	16	7.846	7.805	7.762	7.715	7.667	7.618	7.567	7.514	7.460	7.405	7.350	7.293	7.237
5	20	9.572	9.478	9.382	9.284	9.186	9.087	8.987	8.887	8.787	8.687	8.587	8.489	8.390
6	24	11.214	11.053	10.891	10.731	10.572	10.413	10.256	10.102	9.949	9.798	9.649	9.504	9.361
7	28	12.774	12.535	12.298	12.065	11.836	11.612	11.392	11.177	10.967	10.762	10.557	10.366	10.176
8	32	14.258	13.929	13.609	13.296	12.991	12.695	12.409	12.129	11.860	11.598	11.345	11.099	10.862
9	36	15.669	15.242	14.829	14.430	14.045	13.674	13.316	12.972	12.641	12.323	12.017	11.723	11.439
10	40	17.010	16.483	15.967	15.477	15.007	14.558	14.129	13.718	13.326	12.951	12.594	12.251	11.924
11	44	18.285	17.640	17.026	16.441	15.885	15.357	14.855	14.379	13.927	13.497	13.088	12.700	12.333
12	48	19.499	18.734	18.013	17.330	16.669	16.328	15.505	14.964	14.452	13.969	13.513	13.082	12.675

TABLE No. 16 (cont.)

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

QUARTERLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate--50% Corporate Tax Rate												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	4	2.313	2.327	2.334	2.344	2.354	2.363	2.372	2.381	2.388	2.396	2.403	2.410	2.417
2	8	4.239	4.240	4.240	4.239	4.237	4.235	4.232	4.229	4.224	4.220	4.215	4.209	4.203
3	12	5.844	5.819	5.795	5.770	5.744	5.718	5.691	5.664	5.636	5.608	5.579	5.550	5.521
4	16	7.180	7.122	7.065	7.007	6.949	6.892	6.834	6.776	6.720	6.662	6.606	6.550	6.494
5	20	8.293	8.196	8.101	8.007	7.913	7.821	7.730	7.640	7.552	7.465	7.380	7.294	7.212
6	24	9.220	9.081	8.945	8.813	8.683	8.556	8.431	8.310	8.191	8.074	7.960	7.849	7.741
7	28	9.991	9.811	9.635	9.465	9.299	9.137	8.980	8.828	8.681	8.537	8.398	8.242	8.130
8	32	10.633	10.412	10.198	9.991	9.791	9.598	9.391	9.231	9.057	8.888	8.726	8.567	8.417
9	36	11.168	10.907	10.656	10.415	10.183	9.961	9.747	9.542	9.345	9.155	8.973	8.796	8.627
10	40	11.613	11.315	11.029	10.757	10.497	10.248	10.010	9.783	9.565	9.357	9.157	8.966	8.783
11	44	11.982	11.650	11.334	11.033	10.748	10.475	10.216	9.970	9.734	9.510	9.296	9.092	8.896
12	48	12.291	11.926	11.582	11.256	10.947	10.655	10.377	10.114	9.863	9.626	9.399	9.184	8.980

TABLE No. 7

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

HALF-YEARLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate--50% Corporate Tax Rate												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	2	1.068	1.081	1.092	1.104	1.115	1.125	1.136	1.146	1.156	1.164	1.174	1.183	1.191
2	4	2.085	2.099	2.112	2.124	2.135	2.145	2.155	2.164	2.172	2.180	2.186	2.193	2.199
3	6	3.052	3.058	3.062	3.066	3.068	3.0682	3.0685	3.0675	3.066	3.063	3.060	3.057	3.052
4	8	3.972	3.961	3.948	3.935	3.921	3.904	3.888	3.870	3.852	3.833	3.814	3.794	3.773
5	10	4.848	4.812	4.776	4.738	4.700	4.662	4.622	4.583	4.544	4.503	4.464	4.424	4.384
6	12	5.680	5.614	5.546	5.479	5.413	5.347	5.281	5.216	5.151	5.088	5.024	4.963	4.901
7	14	6.472	6.369	6.266	6.165	6.066	5.967	5.872	5.778	5.686	5.595	5.508	5.422	5.338
8	16	7.225	7.080	6.936	6.798	6.661	6.530	6.401	6.277	6.156	6.039	5.925	5.814	5.708
9	18	7.942	7.749	7.562	7.382	7.207	7.038	6.876	6.720	6.570	6.424	6.285	6.150	6.021
10	20	8.645	8.380	8.146	7.921	7.705	7.499	7.302	7.113	6.933	6.760	6.595	6.437	6.286
11	22	9.273	8.974	8.690	8.419	8.162	7.916	7.683	7.462	7.252	7.052	6.862	6.682	6.510
12	24	9.891	9.534	9.197	8.879	8.578	8.293	8.026	7.772	7.533	7.307	7.093	6.891	6.699

TABLE No. 7 (cont.)

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

HALF-YEARLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate—50% Corporate Tax Rate												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	2	1.199	1.207	1.214	1.222	1.229	1.238	1.243	1.249	1.255	1.261	1.267	1.272	1.277
2	4	2.204	2.209	2.214	2.217	2.221	2.225	2.227	2.229	2.231	2.233	2.234	2.235	2.236
3	6	3.047	3.042	3.036	3.029	3.022	3.015	3.007	2.999	2.990	2.982	2.973	2.964	2.955
4	8	3.753	3.733	3.711	3.689	3.668	3.646	3.625	3.603	3.581	3.560	3.527	3.515	3.494
5	10	4.345	4.305	4.267	4.228	4.190	4.152	4.114	4.076	4.041	4.004	3.968	3.933	3.898
6	12	4.841	4.782	4.724	4.666	4.610	4.556	4.502	4.449	4.397	4.347	4.297	4.248	4.200
7	14	5.257	5.105	5.099	5.024	4.950	4.878	4.808	4.741	4.675	4.610	4.547	4.476	4.427
8	16	5.605	5.505	5.408	5.315	5.224	5.137	5.052	4.970	4.890	4.814	4.739	4.667	4.597
9	18	5.897	5.777	5.662	5.551	5.445	5.343	5.244	5.149	5.058	4.970	4.885	4.803	4.725
10	20	6.141	6.003	5.871	5.744	5.623	5.507	5.397	5.290	5.188	5.090	4.996	4.906	4.820
11	22	6.346	6.191	6.043	5.902	5.767	5.639	5.517	5.400	5.289	5.183	5.081	4.984	4.891
12	24	6.518	6.347	6.184	6.029	5.883	5.744	5.612	5.487	5.368	5.254	5.167	5.043	4.945

TABLE No. 8

Present Worth of £1 due M Times per Annum after N Years at I Percent Interest

ANNUAL REPAYMENTS

No. of Years	No of Rentals	Nominal Interest Rate----50% Corporate Tax Rate												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	1	0.546	0.555	0.563	0.571	0.579	0.587	0.594	0.601	0.609	0.615	0.622	0.628	0.632
2	2	1.066	1.078	1.089	1.100	1.110	1.120	1.129	1.138	1.147	1.155	1.162	1.170	1.177
3	3	1.562	1.572	1.582	1.590	1.598	1.605	1.611	1.618	1.623	1.628	1.633	1.637	1.641
4	4	2.034	2.038	2.041	2.044	2.045	2.046	2.0465	2.046	2.045	2.044	2.041	2.040	2.037
5	5	2.484	2.478	2.471	2.463	2.456	2.447	2.437	2.428	2.417	2.408	2.397	2.386	2.376
6	6	2.912	2.892	2.873	2.853	2.832	2.811	2.790	2.769	2.748	2.727	2.706	2.686	2.665
7	7	3.321	3.284	3.248	3.213	3.177	3.142	3.107	3.074	3.040	3.008	2.975	2.944	2.913
8	8	3.708	3.653	3.599	3.545	3.494	3.443	3.394	3.346	3.308	3.253	3.209	3.167	3.124
9	9	4.078	4.002	3.926	3.855	3.785	3.717	3.652	3.589	3.528	3.470	3.412	3.358	3.305
10	10	4.431	4.330	4.233	4.140	4.051	3.966	3.884	3.805	3.731	3.658	3.589	3.522	3.459
11	11	4.766	4.640	4.519	4.405	4.296	4.192	4.093	3.999	3.910	3.824	3.743	3.665	3.592
12	12	5.085	4.932	4.787	4.650	4.520	4.398	4.281	4.172	4.069	3.970	3.877	3.789	3.704

TABLE No. 8 (cont.)

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

ANNUAL REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate---50% Corporate Tax Rate												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	1	0.641	0.647	0.635	0.658	0.664	0.669	0.675	0.680	0.685	0.690	0.695	0.700	0.704
2	2	1.183	1.190	1.196	1.202	1.209	1.214	1.218	1.224	1.228	1.233	1.237	1.242	1.245
3	3	1.645	1.647	1.650	1.652	1.654	1.656	1.658	1.659	1.660	1.661	1.662	1.6622	1.6625
4	4	2.034	2.031	2.027	2.024	2.020	2.016	2.011	2.007	2.002	1.997	1.992	1.988	1.983
5	5	2.365	2.354	2.342	2.330	2.320	2.308	2.297	2.286	2.274	2.263	2.252	2.241	2.229
6	6	2.645	2.625	2.605	2.585	2.566	2.546	2.527	2.508	2.490	2.473	2.454	2.436	2.418
7	7	2.883	2.853	2.823	2.795	2.767	2.739	2.713	2.686	2.661	2.636	2.611	2.583	2.565
8	8	3.083	3.044	3.005	2.968	2.932	2.897	2.862	2.829	2.797	2.766	2.735	2.706	2.677
9	9	3.254	3.205	3.157	3.111	3.067	3.025	2.983	2.943	2.905	2.867	2.832	2.796	2.764
10	10	3.399	3.340	3.284	3.228	3.178	3.128	3.080	3.035	2.990	2.948	2.907	2.867	2.830
11	11	3.521	3.454	3.389	3.328	3.269	3.213	3.159	3.107	3.059	3.011	2.966	2.923	2.880
12	12	3.625	3.549	3.477	3.409	3.343	3.282	3.223	3.166	3.112	3.061	3.012	2.965	2.920

TABLE No. 9

Present Worth of £1 due M times per Annum
After N Years at I percent Interest

MONTHLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate--- 50% Corporate Tax Rate: Inc. Capital Allowances												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	12	11.507	11.419	11.330	11.249	11.175	11.093	11.020	10.951	10.875	10.806	10.743	10.674	10.608
2	24	22.443	22.161	21.879	21.614	21.363	21.102	20.857	20.624	20.381	20.161	19.939	19.717	19.502
3	36	32.841	32.265	31.700	31.162	30.652	30.133	29.648	29.171	28.692	28.244	27.926	27.375	26.954
4	48	42.714	41.768	40.843	39.959	39.121	38.284	37.491	36.722	35.957	35.240	34.516	33.861	33.199
5	60	52.102	51.496	49.352	48.064	46.843	45.638	44.493	43.394	42.307	41.290	40.312	39.352	38.430
6	72	61.354	59.118	57.277	55.531	53.882	52.265	51.377	49.270	47.859	46.522	45.247	44.002	43.284
7	84	69.507	67.029	64.653	62.410	60.298	58.249	56.325	54.490	52.711	51.048	49.467	47.935	46.481
8	96	77.564	74.469	71.516	68.745	66.149	63.646	61.307	59.088	56.951	54.961	53.078	51.267	49.554
9	108	85.227	81.468	77.908	74.585	71.482	68.513	65.753	63.147	60.655	58.326	56.167	54.084	52.126
10	120	92.506	88.051	83.858	79.963	76.345	72.907	69.722	66.733	63.893	61.269	58.808	56.470	54.279
11	132	99.426	94.242	89.396	84.917	80.777	76.869	73.264	69.901	66.722	63.796	61.069	58.488	56.081
12	144	106.001	100.067	94.551	89.481	84.818	80.439	76.425	72.696	69.193	65.981	63.000	60.194	57.587

TABLE No. 9 (Cont.)

Present Worth of £1 due M times per Annum
After N Years at 1 percent Interest

MONTHLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate -- 50% Corporate Tax Rate: Inc. Capital Allowances												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	12	10.547	10.491	10.430	10.373	10.315	10.259	10.203	10.144	10.097	10.040	9.989	9.936	9.889
2	24	19.297	19.099	18.899	18.708	18.515	18.331	18.144	17.941	17.790	17.611	17.442	17.271	17.112
3	36	26.550	26.161	25.773	25.402	25.031	24.675	24.322	23.968	23.649	23.314	22.999	22.682	22.383
4	48	32.565	31.956	31.354	30.778	30.207	29.663	29.124	28.594	28.108	27.609	27.135	26.668	26.226
5	60	37.549	36.707	35.881	35.092	34.317	33.581	32.859	32.150	31.499	30.840	30.216	29.603	29.025
6	72	41.680	40.602	39.550	38.554	37.581	36.658	35.759	34.883	34.078	33.269	32.506	31.762	31.061
7	84	45.101	43.795	42.528	41.329	40.168	39.071	38.009	36.979	36.034	35.095	34.206	33.261	32.539
8	96	47.937	46.411	44.941	43.556	42.221	40.965	39.756	38.590	37.520	36.464	35.468	34.512	33.611
9	108	50.283	48.552	46.896	45.339	43.849	42.449	41.109	39.825	38.646	37.488	36.405	35.365	34.388
10	120	52.229	50.308	48.480	46.768	45.139	43.613	42.157	40.769	39.499	38.256	37.097	35.986	34.950
11	132	53.837	51.745	49.762	47.914	46.160	44.524	42.969	41.494	40.144	38.833	37.610	36.444	35.356
12	144	55.169	52.921	50.801	48.830	46.968	45.237	43.597	42.046	40.632	39.262	37.987	36.775	35.649

TABLE No. 10

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

QUARTERLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate—50% Corporate Tax Rate: Inc. Capital Allowances												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	4	3.865	3.842	3.818	3.796	3.777	3.754	3.734	3.717	3.695	3.677	3.658	3.642	3.622
2	8	7.541	7.458	7.375	7.297	7.222	7.145	7.074	7.004	6.933	6.867	6.803	6.736	6.673
3	12	11.037	10.861	10.689	10.526	10.369	10.210	10.064	9.918	9.771	9.633	9.502	9.368	9.239
4	16	14.358	14.065	13.777	13.501	13.241	12.981	12.735	12.496	12.257	12.033	11.819	11.603	11.398
5	20	17.517	17.079	16.653	16.247	15.864	15.484	15.125	14.779	14.437	14.116	13.808	13.506	13.214
6	24	20.522	19.917	19.331	18.779	18.258	17.744	17.261	16.799	16.346	15.922	15.516	15.121	14.743
7	28	23.376	22.588	21.829	21.114	20.441	19.787	19.173	18.587	18.019	17.488	16.975	16.492	16.027
8	32	26.092	25.100	24.156	23.268	22.435	21.632	20.884	20.171	19.486	18.847	18.243	17.658	17.108
9	36	28.674	27.466	26.321	25.253	24.256	23.300	22.411	21.572	20.769	20.025	19.323	18.651	18.016
10	40	31.128	29.702	28.341	27.085	25.917	24.807	23.779	22.813	21.895	21.045	20.251	19.491	18.780
11	44	33.461	31.787	30.221	28.772	27.433	26.168	25.001	23.912	22.882	21.933	21.045	20.206	19.424
12	48	35.683	33.759	31.973	30.327	28.787	27.823	26.095	24.885	23.744	22.700	21.729	20.813	19.963

TABLE No. 10 (cont.)

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

QUARTERLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate ——50% Corporate Tax Rate: Inc. Capital Allowances												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	4	3.608	3.597	3.576	3.560	3.545	3.530	3.515	3.500	3.486	3.472	3.458	3.444	3.432
2	8	6.613	6.555	6.496	6.439	6.381	6.327	6.272	6.217	6.167	6.115	6.065	6.015	5.968
3	12	9.117	8.996	8.878	8.765	8.650	8.543	8.434	8.326	8.228	8.126	8.028	7.931	7.840
4	16	11.201	11.011	10.823	10.644	10.465	10.297	10.128	9.961	9.811	9.653	9.506	9.360	9.221
5	20	12.937	12.671	12.411	12.163	11.917	11.684	11.456	11.231	11.026	10.817	10.620	10.423	10.241
6	24	14.383	14.039	13.704	13.387	13.076	12.783	12.495	12.216	11.959	11.699	11.454	11.216	10.992
7	28	15.586	15.168	14.761	14.377	14.004	13.651	13.308	12.977	12.674	12.370	12.085	11.778	11.545
8	32	16.587	16.097	15.623	15.176	17.745	14.339	13.917	13.570	13.223	12.879	12.557	12.242	11.952
9	36	17.422	16.862	16.325	15.820	15.335	14.882	14.445	14.027	13.644	13.266	12.912	12.569	12.250
10	40	18.116	17.493	16.896	16.340	15.808	15.310	14.835	14.381	13.965	13.558	13.177	12.812	12.472
11	44	18.692	18.011	17.364	16.759	16.186	15.650	15.140	14.656	14.212	13.780	13.377	12.992	12.632
12	48	19.174	18.437	17.744	17.098	16.486	15.918	15.379	14.867	14.400	13.948	13.525	13.124	12.752

TABLE No.11

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

HALF-YEARLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate--50% Corporate Tax Rate: Inc. Capital Allowances												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	2	1.954	1.948	1.938	1.932	1.926	1.917	1.912	1.906	1.899	1.891	1.888	1.882	1.876
2	4	3.815	3.782	3.749	3.717	3.687	3.655	3.627	3.599	3.568	3.542	3.515	3.489	3.463
3	6	5.585	5.510	5.435	5.365	5.298	5.228	5.164	5.101	5.037	4.977	4.920	4.864	4.807
4	8	7.269	7.143	7.008	6.886	6.771	6.652	6.543	6.436	6.329	6.229	6.133	6.036	5.942
5	10	8.872	8.671	8.477	8.291	8.117	7.944	7.779	7.621	7.466	7.317	7.178	7.038	6.905
6	12	10.394	10.116	9.844	9.588	9.348	9.111	8.888	8.674	8.463	8.268	8.078	7.894	7.719
7	14	11.844	11.477	11.122	10.789	10.476	10.168	9.883	9.609	9.342	9.092	8.857	8.626	8.407
8	16	13.222	12.758	12.311	11.896	11.503	11.127	10.773	10.439	10.114	9.913	9.527	9.250	8.990
9	18	14.534	13.964	13.422	12.918	12.446	11.993	11.572	11.175	10.794	10.439	10.106	9.785	9.483
10	20	15.820	15.101	14.459	13.862	13.306	12.778	12.289	11.829	11.391	10.985	10.605	10.241	9.900
11	22	16.969	16.171	15.425	14.733	14.096	13.489	12.930	12.409	11.915	11.459	11.034	10.631	10.252
12	24	18.105	17.180	16.325	15.538	14.814	14.131	13.508	12.925	12.377	11.874	11.405	10.963	10.551

TABLE No. 11 (cont)

Present Worth of £1 due M Times per Annum
after N Years at I Percent Interest

HALF–YEARLY REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate---50% Corporate Tax Rate: Inc. Capital Allowances												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	2	1.870	1.866	1.860	1.856	1.851	1.848	1.842	1.836	1.832	1.827	1.823	1.818	1.813
2	4	3.438	3.415	3.392	3.368	3.345	3.324	3.300	3.277	3.257	3.236	3.214	3.194	3.175
3	6	4.753	4.703	4.651	4.601	4.551	4.504	4.456	4.408	4.365	4.321	4.278	4.235	4.196
4	8	5.855	5.771	5.685	5.603	5.524	5.447	5.372	5.296	5.228	5.158	5.075	5.023	4.961
5	10	6.778	6.655	6.537	6.422	6.310	6.203	6.097	5.992	5.900	5.802	5.710	5.620	5.535
6	12	7.552	7.393	7.237	7.088	6.943	6.807	6.672	6.540	6.420	6.299	6.183	6.070	5.964
7	14	8.201	7.892	7.812	7.631	7.455	7.288	7.125	6.969	6.825	6.680	6.543	6.396	6.286
8	16	8.744	8.511	8.285	8.073	7.867	7.675	7.487	7.306	7.139	6.975	6.819	6.669	6.528
9	18	9.199	8.931	8.674	8.432	8.200	7.982	7.772	7.569	7.385	7.201	7.029	6.863	6.709
10	20	9.580	9.281	8.994	8.725	8.468	8.227	7.998	7.776	7.574	7.375	7.189	7.011	6.844
11	22	9.900	9.571	9.258	8.965	8.685	8.425	8.176	7.938	7.722	7.510	7.311	7.122	6.945
12	24	10.168	9.812	9.474	9.158	8.860	8.581	8.317	8.066	7.837	7.613	7.435	7.206	7.022

TABLE No. 12

Present Worth of £1 due M Times per Annum after N Years at I Percent Interest

ANNUAL REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate—50% Corporate Tax Rate: Inc. Capital Allowances												
		5	6	7	8	9	10	11	12	13	14	15	16	17
1	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2	1.951	1.942	1.933	1.925	1.917	1.908	1.900	1.892	1.884	1.877	1.868	1.861	1.854
3	3	2.858	2.833	2.808	2.782	2.760	2.735	2.711	2.691	2.666	2.645	2.626	2.604	2.584
4	4	3.722	3.672	3.623	3.577	3.532	3.486	3.444	3.402	3.360	3.321	3.282	3.246	3.208
5	5	4.546	4.465	4.386	4.310	4.241	4.169	4.101	4.038	3.971	3.913	3.854	3.796	3.742
6	6	5.329	5.211	5.099	4.993	4.891	4.790	4.695	4.605	4.515	4.431	4.351	4.273	4.197
7	7	6.077	5.918	5.765	5.623	5.487	5.354	5.229	5.112	4.995	4.888	4.784	4.684	4.588
8	8	6.786	6.583	6.388	6.204	6.034	5.867	5.712	5.564	5.435	5.286	5.160	5.039	4.920
9	9	7.463	7.212	6.969	6.746	6.537	6.334	6.146	5.968	5.796	5.639	5.486	5.342	5.205
10	10	8.109	7.803	7.513	7.245	6.996	6.758	6.537	6.328	6.130	5.944	5.771	5.604	5.448
11	11	8.722	8.361	8.021	7.709	7.419	7.143	6.888	6.650	6.426	6.214	6.019	5.831	5.657
12	12	9.305	8.887	8.497	8.137	7.806	7.494	7.205	6.938	6.685	6.451	6.234	6.028	5.834

TABLE No. 12 (cont.)

Present Worth of £1 due M Times per Annum after N Years at I Percent Interest

ANNUAL REPAYMENTS

No. of Years	No. of Rentals	Nominal Interest Rate---50% Corporate Tax Rate: Inc. Capital Allowances												
		18	19	20	21	22	23	24	25	26	27	28	29	30
1	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2	1.845	1.840	1.832	1.826	1.821	1.814	1.805	1.799	1.793	1.787	1.780	1.775	1.768
3	3	2.566	2.546	2.528	2.509	2.491	2.474	2.457	2.439	2.424	2.407	2.392	2.375	2.361
4	4	3.173	3.140	3.105	3.074	3.042	3.012	2.980	2.950	2.923	2.894	2.866	2.841	2.816
5	5	3.689	3.639	3.588	3.539	3.494	3.448	3.404	3.360	3.320	3.279	3.241	3.202	3.165
6	6	4.126	4.085	3.991	3.927	3.864	3.803	3.745	3.687	3.635	3.583	3.531	3.481	3.433
7	7	4.497	4.411	4.325	4.246	4.167	4.092	4.021	3.948	3.885	3.819	3.757	3.691	3.642
8	8	4.809	4.706	4.604	4.508	4.415	4.328	4.241	4.158	4.084	4.008	3.936	3.867	3.787
9	9	5.076	4.955	4.836	4.726	4.619	4.519	4.421	4.326	4.241	4.154	4.075	3.995	3.925
10	10	5.302	5.164	5.031	4.903	4.786	4.673	4.564	4.461	4.365	4.272	4.183	4.097	4.019
11	11	5.493	5.340	5.192	5.055	4.923	4.800	4.682	4.567	4.466	4.363	4.268	4.177	4.090
12	12	5.655	5.487	5.327	5.178	5.034	4.903	4.776	4.654	4.544	4.435	4.334	4.237	4.164

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